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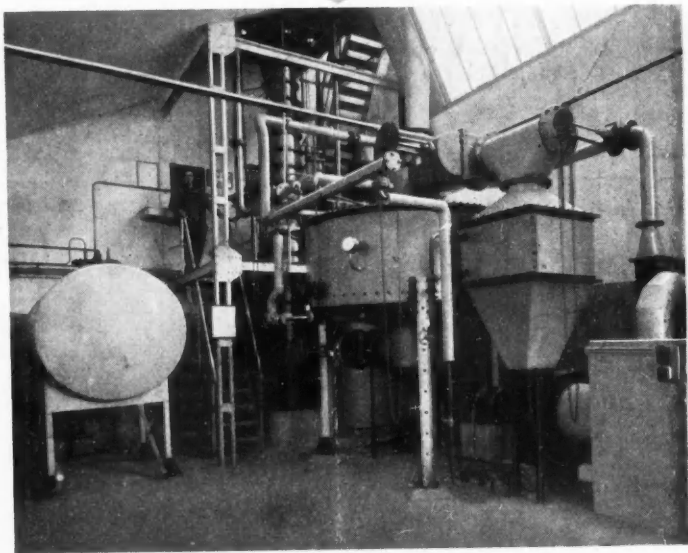
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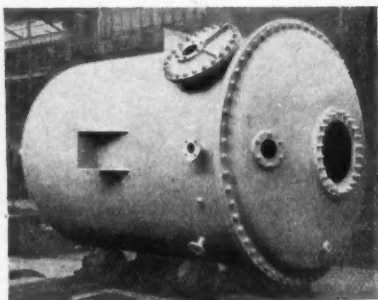
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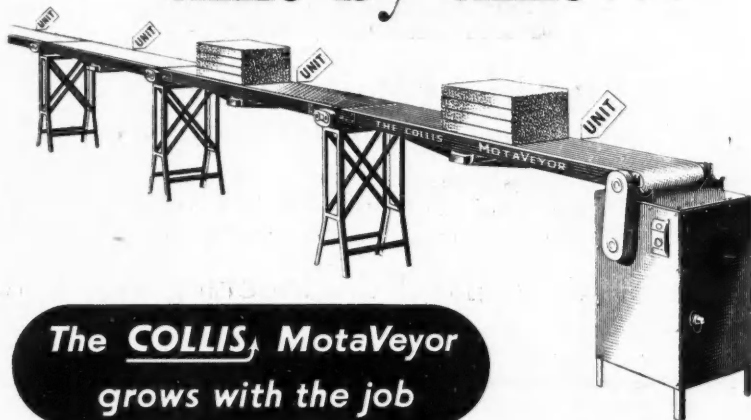
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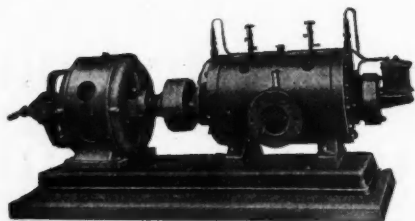
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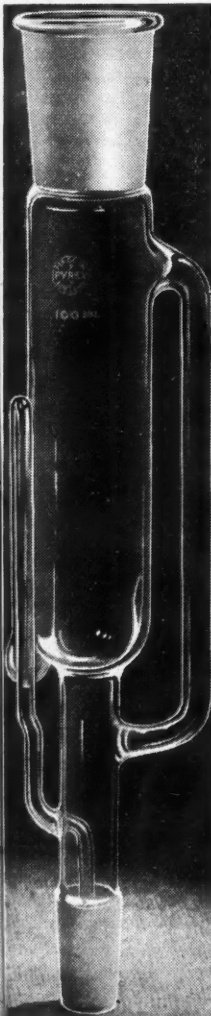


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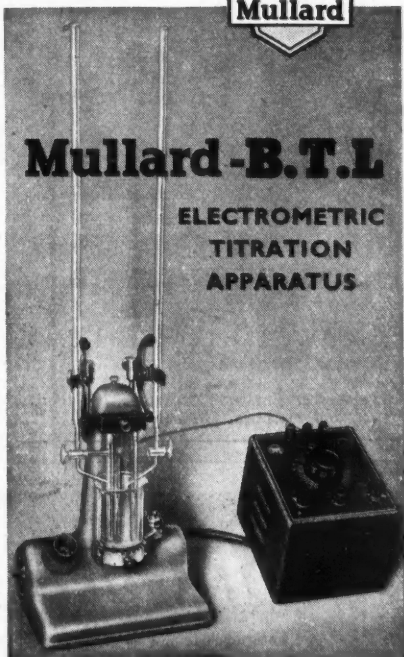
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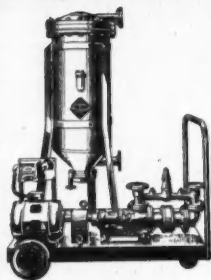
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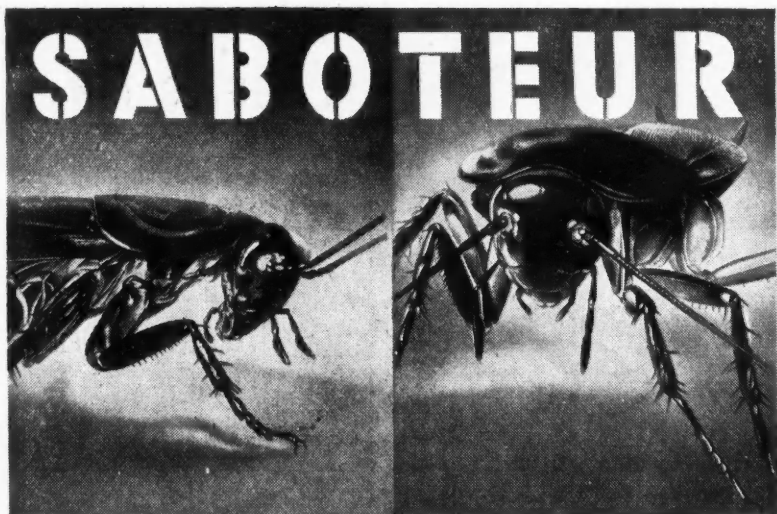


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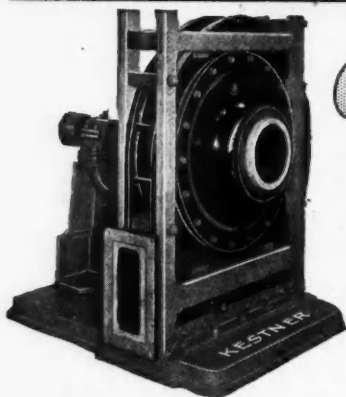
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No. 1492.

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Optical Glass

THE history of optical glass is connected with many famous names in science and is particularly identified in its industrial applications in this country with the firm of Chance Brothers. The second Chance Memorial Lecture given by Sir Hugh Chance makes fascinating reading, recording more than a century of continuous effort ultimately successful. It is well to remind ourselves sometimes that famous men have not always succeeded and that there have been costly failures resulting from the work of men who in other spheres later made their mark in the history of science or industry.

A great deal of the difficulty which confronted the pioneer manufacturer of optical glass was the comparatively small demand for his product. The demand for this glass in the 18th century was for telescopes and other instruments requiring only small aggregate quantities. It demanded, therefore, a good deal of courage on the part of the pioneers to expend much labour or money in solving very difficult problems, knowing how meagre the financial returns were likely to be. In 1850, for example, the manager of the Chance works made a long trip to the Continent and appeared to be very pleased to have returned home with orders to the value of nearly £200; in the previous year the same manager regarded as highly successful orders from London opticians to the value of £250.

The pioneers could not have foreseen the extent to which mankind in the 20th century would be dependent upon optical

glass for huge telescopes for astronomical purposes, for the smaller telescopes used in navigation and for so many terrestrial purposes, for microscopes, for many other scientific instruments, and above all for spectacles, reading glasses, and so forth. The history of the optical glass industry is a very good illustration of the principle that once a good material is available on the market uses will generally be found.

Like so many other manufactures dating back over a century, optical glass was retarded in its development by lack of scientific knowledge. In the latter half of the 18th century such optical glass as was made was unsuitable because of lack of ability to remove the colour of the image caused by the refraction of light in a single lens; progress was made by the discovery of the achromatic lens by Hali in 1729-33 and its subsequent development by the optician John Dollond. Even so, there was still difficulty, partly because the small potential demand was not thought to warrant special attention and it was difficult to find a piece of glass good enough to make a 3-inch objective. This limitation in the size of objectives was due to lack of homogeneity in the glass. It seems obvious to-day how to overcome this, but the problem proved extremely difficult to the manufacturers of glass in the 18th century; and the density of their glass was known to vary throughout the pot or crucible so that it showed traces of striae.

It occurred to a Swiss woodworker named Guinand that this lack of homo-

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geneity might be overcome by stirring the glass in the crucible while still molten. It took him some years to discover what was the best method of stirring. This was found in 1805 to be by a hollow cylinder of burnt clay, moved through the glass by means of an iron hook-ended rod. It is surprising to observe from Sir Hugh Chance's lecture that this simple discovery was the key to the development of the optical glass industry and that it was through this that Fraunhofer was able to make much progress in the early years of the 19th century.

The "secret" thus discovered by Guinand was purchased from Guinand's son for 3000 francs in 1827 by Georges Bontemps, who further improved upon the method and in the following year produced good discs up to 20 inches in diameter. Bontemps later joined Chance and in 1840 came to England to perfect optical glass.

While there is not space here to pursue the history of optical glass manufacture in detail, a noteworthy fact is that English users of glass, such as the fighting services, took no interest in these developments. After 1864 there was a decline in demand so that the profits averaged no more than £1000 a year; by 1893 they had disappeared altogether because the German glass manufacturers had become competitive.

These Continental developments enabled the rise of the German industry. Its success was due to the moral and material help accorded by the authorities to the arts and sciences and to the foundation in 1881 of the German Society for Mechanics and Optics, having for its object the improve-

ment of precision mechanics from the scientific, technical, and economic standpoints. A journal was founded by the Society to keep users and technologists in the industry informed of developments and ideas; schools were established at Berlin, Frankfurt, and other towns for instruction of young students in the theory and practice of the art. Sir Hugh Chance adds to his account of these developments this significant conclusion: "However distasteful it may be, we must recognise that the main factors behind the success of the German industry were the co-operation of the scientist and the trained technician, backed by a body of highly skilled craftsmen and supported by energetic and far-sighted men of business. No doubt Government interest and encouragement was a contributory factor but this could not have been effective on its own."

It may be that Government interest, if expressed in a sufficiently tangible way might materially assist the development of such an industry. If the War Office and the Navy, for example, had recognised the advantages of optical glass and had promised sufficient orders to maintain the industry in a state of solvency, Government encouragement might have been decisive without commercial aids. Neither Government nor business encouragement, however, could have been of any use without the co-operation of the scientist and the trained technician. We have here a principle, the value of which was established by painful experience 50 years ago which must be a general guide to the development of new industries to-day.

NOTES AND COMMENTS

Anti-trust Legislation ?

A WRITTEN answer by Mr. J. W. Belcher to a question in Parliament last week confirmed that the President of the Board of Trade hopes to introduce a Bill this session "dealing with trusts and combines which pursue anti-social practices." That at least was the form of the question to which an affirmative answer was given. At this stage it is not known whether such a Bill will be aimed at any particular industry; the Government would no doubt find it more expedient both from the legislative as well as the political point of view to apply its provisions to industry generally. There has lately been some evidence that the operation of the patent laws has not been invariably beneficial, bearing in mind the overriding need just now to widen the bases of production in all reasonable directions. That circumstance is receiving wider recognition and there have been one or two significant indications that the need for wider use of the available tools provided by science and technology cannot indefinitely be overlooked. On those grounds Government action might be widely supported. If on the other hand the administration has in mind a "witch hunt" permitting the probing of private records and technical policies at the will of any group, the reaction is likely to be as embittered as is discussion of the National Health Service Act and the outcome even less fruitful than are America's Anti-Trust laws.

Timely Warning

BECAUSE it deserves to be recorded as concrete evidence of some of the impediments by which the useful activity of certain sections of the chemical industry is being circumscribed, the statement in which Athole G. Allen (Stockton), Ltd., announces its intention to cease production of a considerable range of important chemical material should be widely circulated. We have accordingly reproduced it at length elsewhere in this issue. Whatever may be the general feeling towards the warning it seeks to convey of prospective limitation and interference by Government departments in other sections of the chemical industry,

this exposition of one undertaking's recent experiences in its dealings with Government departments and the National Coal Board represents a criticism that no responsible authority can afford to dismiss unanswered. Athole G. Allen is quite certainly not unique in experiencing the difficulties in securing essential raw material and ungrudging co-operation from workers, and from the tributary branches of government with which all the larger industries are increasingly involved. There is, unfortunately, virtually a tradition which inhibits most chemical manufacturers from informing the rest of the industry of their affairs, least of all of their difficulties. While the principal organised groups of chemical manufacturers are presumably not unaware of the increasing difficulties imposed by contemporary legislative and economic affairs, or indifferent to them, the widest ventilation of these problems is likely in the long run to be the only means of securing effective remedial action. If this were more generally given, those Government departments on which there rests at the moment a heavier responsibility than ever before to foster greater production will be unable to protest, as did the Ministry of Fuel in time of crisis, that they had not been warned.

Causes of Accidents

"ONE of the greatest puzzles in the whole of chemical industry is the carelessness displayed in the matter of wearing goggles." So says the current (1946) annual Report of the Chief Inspector of Factories (Cmd. 7299, H.M.S.O., 2s. 6d.), pinpointing in one aspect of its survey the common denominator belonging to practically every one of the deplorable accidents in chemical and kindred undertakings quoted from a year's survey. Carelessness towards the use of goggles and protective clothing, indifference to the powerfully destructive potentialities of many common industrial fluids, forgetfulness that where some chemical substances were lately confined may lurk gases more deadly than those associated with war, these represent the causes of the bulk of the casualties—and they might all be classified under one heading—carelessness.

The theme is not, of course, a new one, every chemical manufacturer of experience must at intervals have had cause to remember that perpetual vigilance in supervising the human element is at least as necessary as watchfulness of the mechanical equipment—and more difficult. Steel, glass and acids conform to a code of behaviour of which the commonest laws at least are well known and safeguards framed in accordance with them will not fail. The human element remains unpredictable. The observers in the Factory Department are well aware of this and have included in the report some useful notes on the behaviour of workers, as, for instance, the tendency of ex-Servicemen freshly demobilised to neglect—often with disastrous results—the precautions which they unfailingly observed before the war.

Seven Per Cent Fewer

WHILE the foregoing and the Chief Inspector's report itself may seem to relate to a year of disasters, the entire story is, of course, very different. Between 1945 and 1946 the total number of accidents reported under the Factory Act declined by 7 per cent—222,933 non-fatal accidents and 826 fatalities in all industries. While the equivalent reduction a year before—of 15 per cent—gave ground for a good deal more satisfaction, a comparison with any of the peak years of war production, when total employment was scarcely larger, indicates how much is being achieved in arresting the industrial casualty list. In 1942 there were 313,267 accidents and 1363 died; a year before 1646 lives were lost. The chief interest in this report resides, however, less in statistics than in the "case book" it includes, showing in the chemical section what were the essential causes of death or injury and, by inference, how their repetition can be avoided. As a more detailed footnote to the revised Model Safety Rules of the Association of British Chemical Manufacturers this aspect of the report deserves the attention of all managements of chemical works. Its only defect is that it is a year behind the times and consequently has nothing to say of the disastrous events in 1947 associated with ammonium nitrate.

Obsolescence

THE summary published in our last issue of the scathing "post mortem" report on the obsolescence of our industrial methods, to which reference was earlier made here (January 24) before the report was generally released in America, was not intended to spread alarm or despondency. We are fortunately confident that it will have had that effect upon no one fully acquainted with the facts of what has been done in the adoption of new principles and modified methods in the chemical industry; and it is not credible that in other industries antiquarian methods are general, as the Chicago machinery specialists have sought to persuade their associates. That there are some grains of truth in this premature funeral oration, however, is suggested by the remarks made this week by Sir Henry Tizard ("if British industry adopted more scientific methods it could raise production 50 per cent higher than the present output"). If allowance is made for English shortcomings having been viewed in America with the intellectual equivalent of the electron microscope, the indictment deserves a dispassionate hearing, especially perhaps by those in the Government now taking increasing responsibility for the scope and direction of many industries. For them, such warnings may be regarded as a rider to the more intimately informed recent review by the Northern correspondent of *The Financial Times* of chemical trade prospects. It was the reverse of optimistic, because, said the writer, it is virtually impossible for chemical manufacturers to obtain permits, materials and labour for extensions planned just before the war and even deferred repairs and maintenance are being delayed by Government restrictions. This, he asserts, is barring the adequate development of new products which the decline of the seller's market, changing demand and Continental competition alike render essential.

Patent Rights.—An agreement between E.C.D., Ltd., engineers, Tonbridge, Kent, and Lt.-Col. G. Ewart Morgans, the proprietor of the Otto ozone patents and processes in the British Empire and in the U.S.A., has conferred on E.C.D., Ltd., the exclusive rights in respect of domestic and industrial models of the system.

Another 2200 Chemical Workers

LATEST employment figures for the chemical and allied industries, contained in the January *Monthly Digest of Statistics*, show that the number engaged at the end of November, 1947, was 358,200. This is an advance of 2200 on the October figure, and is the highest recorded since the changeover from war to peace production in the summer of 1945.

As in October, the majority of new entrants (1900) have been allocated to the export sections of the industry. For how long recruitment will continue at this rate, and to what extent it can be attributed to

the Control of Engagement Order and to improved working conditions and increased wages, are matters for conjecture.

On the production side, sulphuric acid and molasses showed appreciable advances both on the previous month and on the same period a year ago. Consumption in most categories fell off slightly from the previous month and from the corresponding period of 1946. Exceptions were sulphur, pyrites and spent oxide. Stocks tended to increase in sympathy with lower consumption.

CHEMICAL PRODUCTION AND USES—NOVEMBER AND DECEMBER

	December 1947 Thousand tons			December 1946 Thousand tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	129.2	—	59.3	120.4	110	63.6
Sulphur	—	21.7	67.1	—	19.3	55.7
Pyrites	—	20.3	75.0	—	17.6	72.0
Spent oxide	—	17.4	163.7	—	16.6	147.5
Molasses†	57.3	30.5*	208.5	44.6	38.5*	123.1
Industrial alcohol †(million bulk gals.)	2.05	2.92	7.68	2.64	2.50	1.74
Superphosphate†	85.9	75.7	149.9	75.5	69.7	157.9
Compound fertiliser†	131.0	99.4	224.5	97.5	76.3	277.1
Agricultural lime†	—	478.9	—	—	306.2	—
Ammonia (weekly average)†	—	6.05	4.69	—	5.77	4.12
Phosphate rock (agricultural)†	—	70.6	94.4	—	60.9	135.9
Phosphate rock (industrial)†	—	6.24	42.8	—	4.57	33.0
Virgin aluminium†	2.25	13.6	—	2.40	12.9	—
Magnesium	—	—	—	0.16	0.16	—
Virgin copper†	—	32.5	104.4	—	32.0	86.6
Virgin zinc†	—	19.9	35.3	—	20.4	33.4
Refined lead†	—	18.2	35.9	—	17.8	28.7
Tin†	—	2.62	15.9	—	2.64	21.3
Zinc concentrates	—	14.0	59.0	—	14.6	104.0
Steel ingots and castings (including alloys)	255†	—	—	246‡	—	—

* Distilling only.

† November.

‡ Weekly average.

INCREASING SUPPLY OF SULPHURIC ACID

Production and Use in October—December

THE summary of the monthly returns of the National Sulphuric Acid Association, Ltd., for the quarter ended December 31, 1947, reveals that production of sulphuric acid and oleum in the United Kingdom and Eire amounted to 385,127 tons. This is an increase of approximately 59,000 tons on the third quarter, and of about 38,000 tons on the second quarter.

Total consumption for manufacturing purposes was 387,191 tons, the principal uses being: superphosphates 119,672; sulphate of ammonia 62,017; rayon and transparent paper 33,794; iron pickling (including tin-plate) 21,623; dyestuffs and intermediates 19,208; and hydrochloric acid 15,588. Drugs and fine chemicals accounted for 2397 tons.

The association provides the following details of production and use:—

* "Receipts" and "Use" include anhydrite "converted" to pyrites.

† Used at works for purposes other than sulphuric acid manufacture.

SULPHURIC ACID AND OLEUM

	Chamber only	Contact only	Chamber and Contact
Tons of 100% H ₂ SO ₄			
Stock Oct. 1, 1947	33,081	24,716	57,797
Production	192,636	192,491	385,127
Receipts	41,719	26,226	67,945
Oleum Feed	—	3,101	3,101
Adjustments	—18	—16	—34
Use	117,933	66,910	184,843
Despatches	114,091	153,684	267,775
Stock Dec. 31, 1947	35,394	25,924	61,318
Total capacity represented	222,580	203,430	426,010
Percentage production	86.5	94.6%	90.4%

RAW MATERIALS (in tons)

	Pyrites*	Spent Oxide	Sulphur Concentrates
Stock Oct. 1, 1947	76,041	155,311	56,947
Receipts	60,304	62,885	54,347
Adjustments	+410	-748	-296
Use	83,173	49,251	63,579
Despatches	560	3,612	67
	22*	284*	77*
Stock Dec. 31, 1947	62,000	164,301	47,275

11

Silver Recovery

Good Yields from Photographic Baths

UNDER Italian patents Nos. 421922-3, R. Piontelli, of the Electrochemical Institute, Milan University, claims improved methods for recovery of silver from photographic fixing baths, with simultaneous regeneration of the bath. The patents date from October 19, 1946, and applications pending in other countries, relate to other metals also. A brief account of the method is given in *La Chim. e l'Ind.*, 1947 (10), 29, 238.

The specifications allude to the various defects of existing methods, and claim, *inter alia*, for the new process: (1) use of diaphragm cell constructed of readily available materials; (2) use generally of soluble anodes of materials less noble than silver under the conditions appertaining; (3) separation in the anode compartment of the reacting materials in the form of practically insoluble compounds; (4) choice of such anodic solutions and diaphragms as to secure the passage of current through the diaphragms by Na^+ (and possibly also H^+) ions migrating from anolyte to catholyte, at the same time avoiding passivation of the anodes by separation of materials; (5) functioning of the cell in general as a galvanic element enclosed in short circuit and of such internal resistance that no external supply is needed; (6) use of porous cathodes to facilitate occlusion of electrolyte and removal of deposit; (7) such choice of ratio between catholyte volume current density, and of cathode design and arrangement as secure a relatively high current concentration, together with low cathode current density uniformly distributed; (8) auto-regulation of process by suitable general conditions of electrolysis.

Rate of Recovery

All these desirable objects are obtained without sacrifice of simplicity and economy. In an apparatus of about 6 litres capacity, with porous ebonite diaphragms, for example, it is possible to recover at least 2 g./hr. of pure compact silver, with a consumption of about 0.5 g. Al/g. Ag, and using an anolyte prepared by suitably diluting a fixing bath exhausted and de-silvered. It is convenient indeed to use portions of the regenerated bath which otherwise would pass out as waste owing to excessive accumulation of organic matter, which in the new method, is removed by very simple procedure, and generally, the operation of de-silvering means replacing the silver separated with sodium or hydrogen ions.

Large-scale tests by photographic firms have confirmed laboratory results.

Australian Customs Tariffs

Some Chemicals Now Duty-Free

THE Australian Department of Trade and Customs has put into effect a British preferential tariff in which the following are placed on the Free List:

Benzoic acid for use in the manufacture of enamels and paints.

Aloes (dried vegetable juice), when not cut, crushed or powdered and not packed for retail sale.

Antutrin 8 in powder form.

Astevan in any form.

Benzocain, sodium borate and menthol, combined in tablet form, when packed under a proprietary name or when put up as a medicinal preparation.

Buchu leaves, when not cut, crushed or powdered and not packed for retail sale.

Fenocyclin in any form.

Pranturon in powder form.

The following, when packed under a proprietary name, or when put up as a medicinal preparation or in any of the forms mentioned in Tariff Item 285 (A):—tetraethyl ammonium; chloroquine diphosphate; Cinchophen sodium and sodium salicylate, combined; Potassium—Guaiaecolsulphonate and preparations containing potassium guaiaecolsulphonate as the chief ingredient; Pyranisamine maleate; Stilboestrol d'propionate; Tetraethylthiuram monosulphide.

Oiticica oil for use in the manufacture of lacquer and of synthetic resins.

Aluminium strips, laminated, for use in the manufacture of shims (packings).

Shellac wax for use in the manufacture of the following:—Bottle stopper compositions; Dressings for leather; Carbon paper; Waxed paper; Polishes.

CUSTOMS REBATE

THE Board of Trade has stated that the Government of Southern Rhodesia has provided for a rebate of customs duties on certain materials required in the manufacture of plastics "on first importations, or when taken out of bond." The schedule of rebates is as follows:

Goods	A General	B Dominions	C U.K. and Colonies
	Per cent	Per cent	Per cent
Cellulose acetate	40	66½	100
Urea			
formaldehyde	40	66½	100
Phenol			
formaldehyde	40	66½	100
Polystyrene ...	40	66½	100

More Swiss Chemicals?—Arising out of the new monetary agreement with Switzerland, facilities for increased imports from that country to the U.K. are to be provided by the Board of Trade and the Treasury. The new arrangement relates to the current year ending February 28, 1948, and—says a Government statement—will provide increased facilities on a moderate scale for the import of a limited number of goods of a type traditionally supplied by Switzerland. The categories of the new imports have not yet been specified.

"Production Indefinitely Suspended"

Stockton Firm's Reasons for Discontinuing Five Products

THE CHEMICAL AGE has received from Athole G. Allen (Stockton), Ltd., of Stockton-on-Tees Chemical Works, the following very full statement of the exceptional difficulties it has lately experienced in maintaining production for home and export trade of an important group of chemicals, as a result of which the company has decided "as an act of prudence" to suspend indefinitely production of five classes of material. The decision refers to barium chloride, ferric chloride, ferrous chloride, toluene nitration products and soda crystals, and as a result it is expected that some 100 workers will now be redundant. The undertaking, which was established in 1928, employed 400-500 during the war and produced 33,000 tons of T.N.T.

Rising Costs

The announcement, which appears over the signature of the chairman and governing director, Mr. Athole G. Allen, states:—

The many price increases we have been compelled to ask our customers to accept has been for some time a matter of grave concern to us. These increases have been caused by additional costs over which we have had no control, but which we have striven to off-set by still better efficiencies. Our efforts have not been successful. Our export business, both direct and indirect has been considerably expanded, and as anticipated, we are meeting with serious competition abroad, to which we can make no reply.

The supply of witherite from the National Coal Board, one of our principal raw materials, has suddenly become very uncertain, and even to-day (February, 1948) we do not know the quantity available to us for the 1948 delivery period. Meanwhile we are having to rely upon our own reserve stock plus deliveries of last year's contract arrears.

We had foreseen such a situation, and some years ago acquired a source of substitute material (barytes) which we now mine ourselves. This, however, we are unable to use owing to the endless delays, and frustration, preventing completion of the necessary plant which, partially constructed, has been standing in the open here at Stockton for the past twelve months.

Other contributory factors are the scarcity of maintenance materials, of satisfactory labour and staff, and the lack of interest displayed in certain quarters. We have before us a letter from a powerful trade union which states that a man's loyalty is related *only* to the purchase price of his labour. Under such conditions good efficiency can never be maintained.

We have also suffered to no small extent, financially and otherwise, by the unfair discrimination shown to "voluntary" organisations by Government Departments, which have virtually ostracised us, presumably because we object to the way in which these organisations are run and consequently we have resigned membership and/or declined to join them.

The implications of the proposals for a Cotton Industry Development Council under the Industrial Organisation and Development Act, 1947, which covers any industry, when applied to the chemical industry can only lead ultimately to the complete elimination of the smaller concerns such as ourselves.

In much the same way the Census of Production requirements present another potential danger to the smaller concerns who may justifiably expect that trade organisations and trade unions will not be considered as "the public" and will have passed to them informa-

tion which should be secret. It is our further considered opinion that the recognition of organisations to segregate the small from the large is another move in the same direction—the ultimate elimination of the smaller concern.

In the circumstances, therefore, we have decided as an act of prudence to suspend indefinitely as from April 1, 1948, the production of barium chloride, ferric chloride, ferrous chloride, toluene nitration products and soda crystals, and to concentrate upon the production of ground barytes at our works at Stockton and mining of barytes mineral at our mines at Middleton-in-Teesdale. We shall endeavour, however, to execute all orders accepted by us up to that date.

We intend to sell by public auction all redundant plant and machinery as soon as the necessary arrangements can be made. . . . We feel it hardly necessary to mention the grief felt by the undersigned at this outcome of 23 years of hard work and initiative, during which a prosperous freehold factory of 25 acres has been built up from a derelict one of 5 acres.

Historic Steelworks Acquired

Developments of Brymbo Planned

IT was confirmed last week that the Brymbo Steelworks, near Wrexham, are being acquired by Guest, Keen & Nettlefolds, of Birmingham and South Wales, and that a new company, the Wrexham Steel Works, Ltd., has been formed to operate the works as from next week. It will operate the Brymbo works under the same local management and staff, and all employees are being invited to re-engage. The total number of staff and workmen involved is about 1300.

Mr. Esmond Morse, managing director of the Brymbo Steel Co., Ltd., said that the new development was primarily for the purpose of increasing the output of electrical "sheet bars," in the production of which Brymbo has specialised for some years.

Mr. T. Roberts, metallurgist and recognised "historian" of the works, where he has been employed for 45 years, has recalled that the famous John Wilkinson established the first blast furnace at Brymbo, and Watt, inventor of the steam engine, bought his first cylinders from the works. Steel smelting was started in 1883, when Brymbo was the first basic open hearth works in the country.

New Steel Technique.—Immense steel developments are beginning to take shape in South Wales, where new strip mills are being set up for the mass-production of steel. The new Steel Company of Wales is following a policy of maximum mechanisation and simplification, which experts believe will revolutionise methods of manufacture in the steel towns of South Wales.

CASUALTIES IN CHEMICAL PLANTS

Factory Inspector's Analysis of Typical Occurrences*

INDUSTRY does not change greatly in the space of one year, and a complete review of any branch of industry for any particular year must closely resemble that for the year before. Limitations of space preclude any attempt to cover the chemical field in detail, and it would seem profitable to deal at length with a few matters deserving of special consideration.

Last Year's Toll

FATAL accidents in all industries in 1947 totalled 1,753, according to the provisional figures just issued by the Ministry of Labour. Of these, 37 occurred in the chemical, oils and soap industries and the largest individual total, excluding mining and quarrying (671), was recorded in metal conversion and foundry undertakings. There were in addition 58 cases of lead poisoning, two of which were fatal and 20 cases and three deaths associated with other forms of poisoning.

Even the preliminary analysis showed that the majority of the chemical injuries are due to accidental splashes of hot or corrosive substances, or by the ignition of inflammable materials, and very many of them occur in trades that cannot properly be included in the term "chemical industry" at all. Though the results in some cases are serious, they do not shock the imagination as do those more dramatic accidents, yet, if it were possible to assess the total misery caused by these smaller accidents, there is no doubt that it would prove greater than that caused by the others.

Hot or Corrosive Materials

This is intended to include all materials that cause chemical injury by contact with the outside of the body, and the defence against such poisons is simply the prevention of contact with the body. This side of the question was dealt with at length in last year's report.

Accidents from these dangerous materials happen in three different sets of circumstances:—

- (1) during process of manufacture or use in a plant;
- (2) during maintenance or repair work on plant that has contained the dangerous material;
- (3) during the handling or use of the material not in a plant, but preparatory

and subsequent to a process or reaction including use in the open shop or for cleaning purposes and the like.

The first case is the easiest to deal with and so, perhaps, receives more than its fair share of attention. The plant must be kept in good condition, so that it does not allow its contents to leak. Drips and splashes from leaking plant cause many minor accidents, but it is often mere chance whether the accident will have trifling or serious results—the smallest drip may mean blindness; any burn or scald may mean worse—for example, a settling tank containing hot copper sulphate in sulphuric acid sprang a leak, and the hot liquor flooded the floor; a liquor maker slipped on the loose cover of a sump, his foot and leg were immersed in the hot liquor in the sump and seriously scalded, and he died next day from shock.

Even when the material is used in closed plant, it is usually necessary to exercise supervision and control over it; its temperature must be watched, its depth gauged. Loose thermometers or dip-sticks involve the opening of the plant, and introduce new risks of contact with the contents—fixed thermometers and gauges avoid the risk.

The taking of samples is another operation in which the operator risks contact with the poison; special sampling points reduce the risks, small glass-fronted cupboards to hold the sample bottle, into which the sample can be run by a cock controlled from outside the closed cupboard. It is essential that there should be complete enclosure; anything less leaves room for improvement.

An outstanding example of complete enclosure has been devised in the past year by one firm for the operation of case-hardening in molten cyanide. It is true that cyanide pots are generally enclosed to prevent the scattering of cyanide in case of explosion, which is a well-recognised risk during the period of melting. The covers are kept closed most of the time, but are necessarily opened for the introduction and withdrawal of the work, and there is some danger of splashing then.

The new plant is totally enclosed. The work is put through a hopper into the pre-heater, and thereafter is handled by entirely automatic means—heated for a measured time in the pre-heater, then passed for a given time to the hardening pot, and finally passed to the quenching bath.

* Abstracts from the Annual Report of the Chief Inspector of Factories, 1946; H.M.S.O., 2s. 6d. net.

The second class of accident, that which happens to the maintenance and repair fitters, is more difficult to deal with. There is no question here of keeping the plant closed; it must, by virtue of the work required, be opened. Many of the accidents happen because dangerous material in the plant is released, and falls or spurts on to the fitter as he opens up the pipe-work or other part of the plant. The parts to be opened have not been isolated from the rest of the plant, and washed out with water, as they should have been.

The mere closing of a valve is not a reliable method of isolation—a blank slip-plate inserted in a flanged joint, and properly bolted up, is far safer. Even after a part has been removed from the plant, that part is still dangerous if it contains dangerous material. Valves were removed from a plant and sent to the fitting shop for repair, but were not washed first. A turner put one in a lathe, and acid was thrown into his eyes as soon as he set the machine in motion.

But even though isolation and purging have been carried out, leakage must still be considered a possibility, and, since the material can no longer be considered enclosed, reliance should be placed on the other method of preventing contact between the poison and the man, i.e., the man should be enclosed in suitable protective clothing, including goggles as a matter of course.

Special Hazards

The fitter's work is often carried out in difficult conditions which may prevent him from avoiding leaks if they do occur, and so it is all the more important that his protection should be thorough.

For example, a plumber in a chemical works, cutting down a disused sagging lead pipe, released residual acid from the pipe, but was so awkwardly placed that he could not avoid it. Again, a fitter's labourer was gathering up some temporary wiring on a phosphate plant, and found it necessary to stand on the cover-plates over a trough conveying a mixture of rock phosphate and sulphuric acid; a small corner at a junction of the trough was not provided with a cover, and his foot slipped into the acid. Admittedly the best preventive of this accident would have been complete enclosure of the trough, and no doubt that would have been provided had it been foreseen that anyone would ever need to stand on the trough when it contained acid. The point is that the fitter's work constantly leads him into dangers that cannot be foreseen in detail beforehand, and therefore he should be so completely protected that he has nothing to fear even from unforeseen dangers.

Wherever men are exposed to contact with corrosive materials, means should be provided by which they can drench themselves quickly and thoroughly with water and also treat eye-splashes at once, without help from anyone else. It is a simple matter to plan the position of baths and of wash-bottles for the eye for the use of process men, whose working positions can be foretold with reasonable certainty. The task is harder for the maintenance man, yet he is more likely to need such help than is the process man. It is not practicable to supply drenching points at every place where a fitter may be splashed; portable wash-bottles for eye injuries and buckets of water would be possible, but what is essential is that the fitters shall know the nearest points at which such aids can be obtained.

Dangerous Handling

Finally, there is the third class of accident, those caused by material not in plants at all. They account for two-thirds of all the "hot and corrosive material" accidents and, as said above, many happen in places not connected with the chemical industry. Carboys are among the worst offenders; they are awkward things to handle at the best.

The pouring of dangerous liquids should be avoided if possible. The material is brought into the works in a tank wagon and pumped from there to storage tanks, from which it is drawn or pumped to the plant. Even though the liquid is brought in carboys or drums, it need not be poured. It can be syphoned or pumped to the plant, and, for carboys, there is at least one excellent device by which the contents can be blown by compressed air from the carboy to the place where it is needed; and this without subjecting the inside and outside of the carboy to a difference of pressure, an important point, for carboys are not designed to act as pressure vessels. When carboys must be moved, there are several makes of good cradles in which they can be moved safely.

Finally, if liquids must be poured from one vessel to another, it should be taken for granted that splashing will occur, and protective clothing should be worn, including goggles as a matter of course.

One of the greatest puzzles in the whole of chemical industry is the carelessness displayed in the matter of wearing goggles, even when they have been provided. A man baling out a solution of strong nitric acid did not use the goggles provided, although splashing was a plain possibility in such an operation, and did in fact occur simply

(Continued overleaf)

PARLIAMENTARY TOPICS

THE Minister of Fuel (Mr. H. Gaitskell), moving on Tuesday the second reading of the Gas Bill, revealed one of the arguments for the Bill was that since coal and electricity were nationalised, gas must also come under public ownership. The present structure of the industry, he maintained, was not conducive to efficiency; the most suitable structure for that purpose could be achieved only under national ownership. The co-partnership schemes existing in the industry would have to go. The N.C.B. and the Gas Area Boards would co-operate in the capital development of carbonisation. He hoped shortly to announce the appointment of a scientific advisory council to co-ordinate research on fuel, the council to include the chief scientific advisers of the nationalised industries and some independent scientists.

Underground Gasification in U.K.?—Underground gasification experiments similar to those recently carried out in the U.S.A., U.S.S.R., and Belgium, are under consideration by the Ministry of Fuel and Power, but no decision has been reached as to whether

such experiments can be undertaken here at this stage.—Mr. H. T. Gaitskell.

Sulphur Fumes.—A pilot gas-washing plant which will be used to determine the most efficient type of installation for the Bankside Power Station is expected to be ready for operation by June. The elimination of sulphur fumes is recognised as an important feature of the project, and it will not be completed unless this requirement is met.—Mr. H. T. Gaitskell.

Petroleum Products.—Particulars of the quantities of petroleum products supplied by British-controlled companies to other countries in 1947 cannot be published because such information is given to the Ministry of Fuel and Power confidentially.—Mr. Gaitskell.

N.C.B. Technicians May Write.—Technicians in the employ of the National Coal Board are free to write and publish the results of research work, though the Board may "wish to have some say on exactly what information is being published abroad by its employees."—Mr. Gaitskell.

(Continued from page 231)

through the bumping of the baling vessel against the side of the tank.

Such accidents are by no means confined to chemical works. A worker in an aluminium foundry, for example, had his face and eyes splashed with molten metal while pouring it into a mould. Some three months later he died from an abscess on the brain, a result of the injury to his eyes, which might well have been prevented had suitable eye protection been worn.

Safe Substitutes

The safest precaution of all has still to be mentioned: as explained in last year's report, it is the precaution that should always be considered first of all, whenever there is a question of using dangerous material—it is the substitution of a harmless material for the dangerous one. There is certainly a great scope for that in the type of work considered here. Acids and caustic soda are used very widely for cleaning and similar operations where less dangerous materials would serve quite as well.

A special word of comment and warning on the dangers arising from lack of care in manipulating caustic soda seems necessary. The word "acid" still commands respect from most people. Acids are used more frequently than they need be and cause many accidents, but still most people who use an acid (if they know what they

are using which, unfortunately, they often do not) do know that it is likely to be harmful, and that they ought to be careful in using it.

With caustic soda the case seems quite different. In one year in one district alone six men each lost an eye when handling caustic soda. Its use has, no doubt, been increased by the soap shortage, for it is an excellent solvent for grease.

Those who must handle caustic soda should at least be fully aware of the dangerous nature of the substance they are handling, and should have full protective clothing, but the better way, by far, is to avoid the use of the material whenever possible, and for many cleaning operations it need not be used. The new "wetting" agents now obtainable will do most of the cleaning that caustic soda can accomplish, and will do it safely.

The inflammable liquids like petrol and paraffin, or the poisonous halogenated hydrocarbons like carbon tetrachloride, also have excellent cleaning properties, it is true, but to substitute them for caustic soda would be to jump out of the frying pan into the fire.

Textile Institute Annual Meeting.—The Textile Institute is to meet at the Town Hall, Macclesfield, on April 21. The annual Matthe Lecture is to be given by Mr. Allan Walton who will deal with "Art in Relation to the Textile Industry."

£8m. Worth of Chemicals and Metals

Post-War Harvest from Ammunition Dumps

SINCE the war ended, the conversion of war materials, principally metals, explosives and chemicals, by the Ministry of Supply and their contractors has produced a supply of industrial materials worth £8,140,000. In addition to the important—but non-recurring—aid which this has rendered to industry, the Exchequer has reaped a profit of more than £4 million.

One of the main sources of material has been ammunition, of which by the end of last year 710,000 tons had been broken down at Royal Ordnance factories. The equivalent of 3300 trainloads of ammunition has been removed to civilian uses from the Service departments.

The immensity of the task which has been handled by the Directorate of Disposals (Breakdown) of the Ministry of Supply is evidenced in a summary appearing in the *Board of Trade Journal* (February 7). It recalls that early in 1946, under an agreement between the British and the United States Governments, all American stores lying in this country were acquired by Britain, and the American stocks of ammunition, amounting to over 150,000 tons, were included in the deal. Surpluses of ammunition have also arisen in the war theatres overseas, and, where shipping is available, it has been found economical to return ammunition from Germany, the Mediterranean, the Middle East and from as far afield as Burma, to the United Kingdom for breakdown.

In Reverse

The Royal Ordnance factories which had manufactured explosives and ammunition during the war were eminently suitable for the work of the breakdown of such stores, which could be a very dangerous process if not carried out under very stringent safety precautions. Thus, buildings previously used for the manufacture of T.N.T. were fitted with new plant designed to boil out the T.N.T. filling in bombs; machines which had been used for making small arms ammunition were altered so as to take the bullet out of the cartridge instead of crimping it into position, and so on. It was putting munition manufacture into reverse.

The main arisings from the breakdown of filled ammunition are steel from shells, bombs and grenades; brass from cartridge cases, fuses, etc.; copper from shell driving bands; lead and other non-ferrous metals from bullets; and such miscellaneous stores as paper, cardboard, rope and wooden packing cases.

The materials already recovered include

some 235,000 tons of cast iron and steel and 138,000 tons of non-ferrous metals.

Various chemicals are also recovered from the explosive filling of the ammunition. Ammonium nitrate, recovered from shells and bombs which are filled with amatol, is used either in the manufacture of commercial explosives or as a fertiliser, some being exported, while sodium picrate is recovered from lyddite-filled shells and used by manufacturers of dyestuffs and pharmaceuticals. Shellite is now being recovered and sold for conversion into picric acid, and potassium nitrate, recovered from gunpowder, is either sold for export or used in this country for bacon curing.

Large stocks of surplus explosives such as T.N.T., tetryl, ammonal, gunpowder and gelignite have been sold to the explosives industries for conversion into types suitable for mining.

Carbon Black from T.N.T.

The T.N.T. arising from the boiling out of surplus ammunition is burnt in specially-designed plants. The carbon particles in the smoke are collected and sold as carbon black, which is used in the paint and tyre industries. Phosphorus, too, is recovered from stores so filled, as it is in demand for the manufacture of various phosphates mainly used in the food industries.

Some of the poison gas stores have their peacetime uses. Bombs containing hydrocyanic acid have been sold and may possibly be used in fumigating ships or in the manufacture of printers' inks. Phosgene, in its turn, is used in synthesising organic chemicals, while cyanogen chloride has been sold to the dyestuffs industry.

Cracker blank, which was used by the Home Guard to imitate rifle fire, has been sold and used in the manufacture of Christmas crackers; and some pyrotechnic stores have been sold for firework displays.

Tin Stocks in December

Stocks of tin metal held by the Ministry of Supply at December 1 amounted to 6326 long tons. After receiving new production (2313) and making deliveries to U.K. consumers and for export (2451), stocks at December 31 were 6188 long tons. Consumers' stocks at 2798 long tons on December 1, were increased by receipts (2326) but reduced by consumption (2346) to 2778 long tons at December 31.

CARBON IN CHEMICAL ENGINEERING

High Resistance to Acids, Heat and Shock

by A. E. WILLIAMS, F.C.S.

ALTHOUGH carbon has in the past not been generally recognised as a material for chemical plant construction, it is being increasingly used in this sphere for the production of tank linings and such equipment as cocks, valves, tubes, steam ejectors, pump and fan components, etc. Its existence in numerous forms, both in the amorphous and crystalline states is well known and it is possible to manufacture from the different varieties of carbon many items of equipment in which the desirable characteristics of the material may be emphasised.

Intricate shapes in carbon may be produced to a high degree of precision and remarkable accuracy is obtained by moulding, in some cases with little or no machining. The method employed to produce the final form is governed mainly by the type of carbon used and the degree of precision required.

Chemical Properties

Even in the presence of atmospheric oxygen, carbon withstands a temperature as high as 350°C., so that it is relatively inert. At higher temperatures the products of a slight oxidation are wholly volatile and cannot affect the nature of the carbon surface. A criterion of the efficiency of carbon at elevated temperatures is the fact that it is used in the form of bearings on such machinery as chain grate stokers, where the bearings themselves reach a temperature well over 300°C. Carbon is not wetted by molten metals or glass, and as a result, carbon industrial crucibles produce no contamination of the batch, which does not adhere to the walls of the vessel when discharged. A decisive advantage which carbon offers is that it is inert to caustic alkalis, strong acids and corrosive salts; only the highly oxidising chemicals, in a hot and concentrated state, can react to damage carbon.

Impervious carbon and graphite have a corrosion resistance practically equal to that of the previous variety, but the working temperature is limited to 200°C. Fittings such as stop-cocks, valves, elbows and tees are being manufactured in carbon to handle liquids and gases under pressure; while tubes ranging from 14 mm. to 103 mm. bore are available. Impervious carbon is used not only for pipe work, but also for linings, nozzles, ejectors, pumps, fractionating columns, etc. The excellent heat transfer properties of impervious graphite make it ideal for the construction of heat exchangers

and evaporators for handling corrosive liquids. Numerous tests have already been carried out by specialist companies and it should shortly be possible to produce complete exchangers which will solve many chemical engineering problems and open up possibilities of recovering heat from waste chemical products.

Low thermal expansion and high thermal conductivity make carbon an outstanding material for resistance to thermal shock. Even under great heat carbon does not melt and sublimates only at temperatures well in excess of 3000°C. Thus, in an inert atmosphere, carbon can be used for long periods at very high temperatures without appreciable loss of strength or characteristics.

Owing to its special properties, carbon has proved successful when used in the form of bearings and seals or glands. It can be manufactured to give a low coefficient of friction and to sustain very heavy loads; it also possesses the property of being self-lubricating and when used against a moving metal surface, with no lubricant present, there is no danger of welding or seizure.

This feature, peculiar to carbon, of requiring no lubrication, has been made use of in a practical way in the manufacture of bearings on machinery handling foodstuffs. In many types of machine the food being handled comes into contact with the bearings and if an oily lubricant were used the foodstuffs would be contaminated. For this reason carbon bearings are often chosen for food and grain conveyors, dough mixing machines, etc.

Carbon bearings are also practically essential on machinery that has to operate at elevated temperatures in which an oily lubricant would be quickly destroyed. Experience shows that such bearings will function satisfactorily in continuous service at elevated temperatures for periods of six months or more.

Carbon Brick Linings

The use of bricks made of carbon for the lining of chemical plant is comparatively new but it has already revealed considerable advantages under extensive and exacting tests. These bricks are not impervious, and a small amount of the chemical may filter through the brickwork; but if the latter is jointed and backed by an impervious and chemically-resistant cement, a complete barrier to the chemical results. Such bricks

are resistant to acids, caustic alkalis, corrosive salts and even to hot hydrofluoric acid and have good mechanical strength.

The impervious cement is now being produced in the form of two components which, when mixed, set within 24 hours to a resilient rubbery solid. The application of heat, or hot liquids, causes the cement to toughen and harden, but the resilient property is retained.

Carbon in Pickling Processes

The modern technique of using hydrofluoric acid mixtures for the pickling of stainless steel lends an additional importance to carbon brick as a lining for pickling tanks, splash trays, acid launders and neutralising pits. The following is a short list of industrial chemicals which one type of carbon brick and cement will safely contain:—

Hydrofluoric acid, up to 60 per cent, cold and hot; hydrochloric acid, all concentrations, cold and hot; nitric acid, up to 35 per cent cold, up to 12 per cent hot; sulphuric acid, up to 60 per cent cold, up to 50 per cent hot; phosphoric acid, all concentrations, cold and hot; chlorine gas, wet and dry, cold and hot; acetic acid, all concentrations, cold and hot; lactic acid, all concentrations, cold and hot; caustic alkali, up to 20 per cent, cold and hot; ammonium hydroxide, all concentrations, cold and hot.

When alkalis are used in tanks lined in this way it is necessary to heat-harden the joints of the lining. Such linings, however, are not suitable for all products, as for example, chlorinated solvents, aromatic hydrocarbons, vegetable oils, concentrated nitric acid, concentrated sulphuric acid, or chemicals of a strongly oxidising character.

The tensile strength of such resistant cement is not high, but is greatly improved if the air-set material can be toughened by heat, and the use of hot liquids in the plant will produce this improvement.

General Use

Carbon linings are coming into general use in the chemical industry for low temperature process furnaces, storage and process tanks, reaction vessels, acid mist and fume duct linings, carbon rollers, drains, flooring, etc. The material is also used as an acid-resisting flooring in the food industries, where it is resistant to fruit juices, milk, beer, etc.

Carbon is peculiar in possessing qualities not combined, properties which the chemical and process industries often demand. Its merits may be summarised as follows: Resistance to attack by most chemicals; low reversible thermal expansion; good mechanical strength at high temperatures; high resistance to thermal shock or steep tempera-

ADVANCED MINING SCHOLARSHIPS

PART-TIME advanced mining scholarships for wage-earning coalminers are announced by the Miners' Welfare Commission. Candidates must be at least 17 years of age by September 1 next, and have satisfactorily completed an approved part-time senior mining course. Scholarships will be awarded initially for one year, but may be renewed for a period not exceeding four years. The awards will be sums not exceeding £30 to cover fees, books, instruments and other expenses. Wages will be paid for the time students spend at courses.

Swiss Chemical Exports

Swiss exports of chemical and pharmaceutical products in 1947 (in million Swiss francs) were valued at 554.1 against 403.4 in 1946 and 198.0 in 1938. The steepest increase occurred in pharmaceuticals and cosmetics, which rose from 63.6 to 171.0 and 229.9. A similar rise was reported in dyestuffs, last year's shipments being valued at 227.8 compared with 175.8 in 1946 and 83.0 in 1938. The rise in the value of exports of industrial chemicals, however, was relatively small at 51.4 to 56.6 and 96.4 respectively.

ture gradient; is not wetted by molten metals; good electrical conductivity; machinability; is self-lubricating; high heat transfer properties of graphite, low heat transfer of carbon; very low friction losses.

Carbon is now being supplied for various industrial purposes in different degrees of porosity, but when required it can be made to a very high standard of imperviability. In pumps for either pressure or suction, or both, the use of carbon glands is well known. Such a gland operates axially, a graphitic carbon ring providing a running seal against a fixed seating in the pump. The carbon ring, though driven by the shaft, is free to slide along it, the ring being sealed to the shaft by a synthetic rubber washer, which forms a feature of the Morgan-Stuart system of gland assembly. This rubber washer, initially flat, takes up a characteristic shape when sprung into position, with its sealing lip embracing the shaft and its flat surface making a flexible seal against the carbon ring, towards which it is pressed by a spring holding the working face of the carbon ring against the counter-face which forms its seating.

[This article, written from the engineer's point of view, does not concern itself with the commercial aspects regulating the supply of carbon materials and components. Supply is at present understood to be considerably smaller than requirements, so that the application of some of the principles outlined here may in many cases have to wait on a fuller flow of materials.]

PROGRESS IN DRUGS AND FINE CHEMICALS—VI

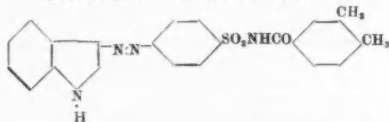
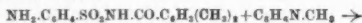
Widening Studies of Fungistatic Substances

by G. COLMAN GREEN, B.Sc., F.R.I.C., A.M.I.Chem.E.

MOST of the substances with chemotherapeutic effect on tubercle bacilli have been bacteriostatic in their action and the reactions between such substances and the bacterial cell are reversible. This claim is made by Zetterberg, of Uppsala (*Nature*, 1947, 106, 235). For example, sulphanilamide and other substances which are antagonised by *p*-aminobenzoic acid give good *in vitro* results but their action is much weakened *in vivo*.

It is therefore important to find substances which interfere with bacterial metabolism directly and irreversibly. Derivatives of sulphonamides have given better results than sulphonamides themselves. For example, "promin," which is *p*:*p'*-diaminodiphenylsulphone-N: N'-didextrose sulphonate, has been used clinically in the treatment of tuberculosis and recently an enhanced effect has been reported when it is used in synergistic combination with streptomycin. As tested by the Warburg manometer the sulphonamides and their simple derivatives have an effect on bacterial metabolism which is detectable only when the drug is present in concentrations far in excess of those obtainable therapeutically.

Zetterberg and his colleague Willstaedt have suggested that the combination of a sulphonamide with a respiratory inhibitor might have a greater bacteriostatic effect than either component alone. A number of substances thus derived are being examined; in the meantime, it has been established that when "Irgafen" or *p*-aminobenzenesulphonyl-3:4-dimethylbenzamide is coupled with 2-methylindole, a respiratory inhibitor, there is obtained *in vitro* with bacilli which are human pathogens a bacteriostatic effect which is considerably in excess of that obtained with either compound alone.



For example, methyl indole inhibited at 1/8000, "Irgafen" at 1/10,000 and the new compound at 1/16,000.

It has been mentioned that a second streptomycin, streptomycin-B, has been iso-

lated through a chromatographic procedure from a *S. griseus* culture medium. Leach *et al.* (*J. Amer. Chem. Soc.*, 1947, 69, 474) have isolated still another antibiotic which is not bacteriostatic but which inhibits the growth of many yeasts.

This antibiotic, which has been named "actidione," is obtained from the metabolite liquor by adsorption on activated carbon, elution with 80 per cent acetone and extraction of the aqueous solution remaining from the distillation of the acetone with chloroform. The chloroform is decolorised and evaporated. The actidione is purified by means of the Craig countercurrent distribution principle with benzene and water to give finally the crystalline substance. Actidione, which rapidly deactivates in alkaline conditions at room temperature, giving a fragrant volatile ketone, failed to inhibit twelve representative species of bacteria at a dilution of 1 mg./litre, but it inhibited the fungal pathogen *Cryptococcus neoformans* at a dilution of 0.0002 mg./litre.

Infection by this particular micro-organism usually involves the brain, meninges and control nervous system, but the lungs, skin and other parts may be less often affected. Infection by this organism is rare but usually ends fatally when it is systemic. The antibiotic appears to be somewhat toxic to the L.D.50 for mice being about 150 mg./kilobodyweight. Appraisal of this drug continues.

Fungistatic Substances

The quest for fungistatic substances has received by no means the same degree of attention that has been bestowed upon the bacteriostatic substances. This is understandable, remembering that, broadly speaking, the greater menace to human health is to be found among the anaerobic pathogenic bacteria than among the aerobic fungi. This disbalance certainly exists where the more dangerous systemic infections are concerned.

Nevertheless, there are numerous fungal infections which, though more often than not restricted to the surface areas, are nevertheless seriously incapacitating.

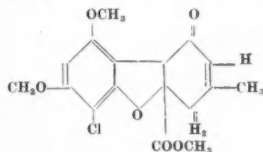
There is a field other than in human infections where fungal diseases are of great importance—that is in plant pathology. Losses due to fungal infections of seedlings and plants must aggregate to huge sums in commercial practice in any year.

Many of the bacteriostatic substances are also fungistats, among these being patulin, aspergillie acid, citrinin, etc. There are, however, antibiotics such as viridin and glutinosin which inhibit the growth of fungi only. These substances are "killers" in one concentration or another; but there is among the fungistats another class of substance which inhibits by reducing the rate of growth through a mechanism which involves the production of physiological abnormalities. Such a substance is griseofulvin.

This fungistat produces stunting, excessive branching of the mycelial threads and gross distortions of the germ-tube in a number of fungi including *Botrytis alii*. *Botrytis* species are responsible for large financial losses since they are the cause of "damping-off" of seedlings.

Griseofulvin, first described by McGowan *et al.* (*Nature*, 1945, 155, 637; *Trans. Brit. Mycol. Soc.*, 1946, 29, 173) is produced by *Penicillium jancevskii*. It was first known as the "curling factor" but is now known to be identical with griseofulvin described by Raistrick and his co-workers in 1939 as a metabolic product of *P. griseofulvin*, and to which a formula was tentatively assigned.

Grove and McGowan now suggest a modification of this original formula in the light of new facts and propose the following structure for griseofulvin, the curling factor:—



An interesting parallelism will be observed between the structure of this fungistat and the tuberculostatic substances previously described—usnic acid and 2-amino-6-chlorodiphenylene oxide. Each of these three antibiotics has the skeleton structure of diphenylene oxide, while two of them are monochlorinated in the aromatic ring, although the chlorine atom is introduced into different positions relative to the oxygen bridge.

Another strain of *P. nigricans-jancevskii*, which has not been identified so far, has been found by Grove and Curtis to produce an antibacterial and fungistatic pigment on Raulin-Thom medium at the rate of 8.0 mgm. per litre culture medium. The pigment is extracted with chloroform and extracted with ethanol. It prevents the growth of *S. aureus* at 50 micrograms per litre and prevents the germination of spores of *B. alii* at a concentration of 0.4 micro-

grams per litre at pH 3.5. The aqueous solutions of the antibiotic are, however, extremely unstable.

Vincent (*J. Soc. Chem. Ind.*, 1947, 66, 149) has described a technique for the study of fungistatic properties of compounds which he has developed in connection with the estimate of such properties among compounds of the 4-hydroxybenzoic acid series. Inhibition is determined by reduction of growth rate, as specifically indicated by the use of dosage/response curves.

Synthetic Fungistat

An interesting synthetic fungistat of simple structure is *p*-chlorophenylglycerol ether. The chlorophenols are well known as antiseptics and it might be expected that condensation with glycerol would confer enhanced solubility through the addition of polar groups. In actual fact, the almost odourless solid is soluble in water only to the extent of 0.6 per cent at 25°C. The entire series of fungi against which this compound was tested were inhibited at 0.25 per cent w/v; saprophytes were inhibited at 0.125 per cent w/v; and dermatophytes were inhibited by a concentration of up to 0.1 per cent w/v. Indeed, *Epidermophyton floccosum* was inhibited at 0.06 per cent w/v and *Trichophyton mentagrophytes* at 0.05 per cent w/v.

The compound is not specifically antifungal since it also possesses antibacterial properties, though these are not of the highest order. It inhibits the usual range of test bacteria at about 0.5 per cent w/v—rather less in some cases—both in the presence of blood and in broth. The rather low antibiotic effect of the substance is, to a large extent, offset by its low order of toxicity and its chemical stability.

Unsuitable for Oral Use

However, Hartley (*Quart. J. Pharmacol. and Pharm.*, 1947, 20, 388) points out that the drug cannot be used in concentrations adequate to ensure its antibacterial and antifungal value in preparations intended for oral use because of the lingering, burning taste which it leaves. It offers, nevertheless, advantages as a preservative. For example, it is an efficient fungistat in gelatin capsules; it is without action on penicillin, but inhibits the destruction of penicillin by certain penicillinase-secreting organisms. It is also effective as an antiseptic in liver injections without producing the protein haze which follows from the use of *p*-cresol; it also prevents the growth of mould on lanette was SX emulsions at a concentration of 0.3 per cent w/v.

WIDESPREAD DEVELOPMENTS IN

ENCOURAGED by the grant of Dominion status to Ceylon, the various Ministries are preparing plans for the agricultural, industrial and economic development of the Island. Already five new industrial schemes have been prepared by the Department of Industries and these have now reached the stage of consultant's reports.

These schemes relate to hydrogenated coconut oil, caustic soda and hydrogen, textiles, steel and paper. All these schemes are separate but they form one co-ordinated plan.

The scheme for the hydrogenation of coconut oil in Ceylon was designed to obtain for the local coconut industry the high prices ruling for the oil content of coconut and at the same time to retain the major output of poonac which constitutes an essential cattle meal in the country.

The scheme envisages the use of a solvent extraction process to obtain a high oil yield and to produce an oil cake of the greatest possible value. The plant will further extract oil from mechanically-expelled poonac produced by the existing mills, this form of poonac still possessing an estimated oil content of 8 to 12 per cent. The oil thus extracted will be refined, deodorised and hardened, the fatty acids resulting from the process being used partly for the manufacture of soap and partly for conversion into glycerine and fatty alcohol.

The processing of groundnut and possibly of rapeseed and the subsequent conversion of the oils into vegetable ghee was subsequently included in the scheme. Quantities of groundnut and rapeseed are available in India, pending the production of Ceylon-grown seeds.

The plant is designed to deal with 200 tons of copra, 50 tons of poonac, and 50 tons of groundnut or rapeseed per day, and the chief products will be 120 tons of hardened oils, 111 tons of poonac, 30 tons of ghee, 14 tons of fatty acid, and one ton of glycerine a day. The estimated cost of the scheme is £335,000.

An essential raw material for processing oil is hydrogen. The cheapest method of producing this gas, says a report in connection with the caustic soda, hydrogen and chlorine plant, is through a caustic soda plant using common salt and water as raw materials.

Caustic soda is, of course, one of the

most vitally needed chemicals—for soap manufacture, oil refining, paper making, cotton mercerisation, and many other chemical industries.

Another by-product of this factory will be chlorine, which is less easy to dispose of. A limited use will be in the sterilisation of water supplies and the bleaching of paper and textiles. A more widespread use will be as a raw material for disinfectants of the DDT type. Investigations are being made in this direction.

Dr. A. J. V. Underwood, the consultant engaged by the Government of Ceylon for this scheme, has recommended the adoption of the electrolytic process for the production of 50,000 cubic feet of hydrogen, five tons of caustic soda and 440 tons of chlorine a day.

The other major schemes which are under preparation are fixation of ammonia from the air in order to make nitrogenous fertilisers, the manufacture of sulphuric acid so that ammonium sulphate can be made, sugar manufacture, and the manufacture of titanium paints and alloy steels from the ilmenite deposits on the seashore north of Trincomalee.

Indian Industrial Planning

INDIA is estimated to require approximately 1.5 million tons of nitrogen annually for all crops. Total nitrogen available from indigenous sources such as oil cake and cow dung, however, is only about 500,000 tons. There is thus an overall shortage of about a million tons per annum to be provided by stepping up production of chemical fertilisers. As the production of ammonium sulphate at the Government factory at Sindri will take some time to develop, this huge deficit will have to be met by imports. Ammonium sulphate imports this year are not likely to exceed 100,000 tons, whereas requirements are about 800,000 tons. Attempts are therefore being made by Indian manufacturers to increase indigenous production. A scheme for producing 50,000 tons per annum of ammonium sulphate in Travancore has already been put into effect by Fertilisers and Chemicals (Travancore), Ltd. Efforts are also being made by chemical manufacturers to produce other kinds of chemical manures, such as superphosphate. The main difficulty here is the high cost of bones.

f Chemical Industries

N PRODUCTION AND RESEARCH

The Indian Tariff Board has ruled that the sodium and potassium metabisulphites industry is not eligible for protection and has recommended that the existing import restrictions should be removed and these chemicals should be subject to the Open General Licence. The Government of India has decided to remove the import restrictions, subject to their general policy in regard to control over imports.

* * *

The Indian Lac Research Institute at Namkum, Ranchi, may become the world's centre for research work on lac if the resolutions of the governing body of the Indian Lac Cess Committee, which concluded its two-day meeting in Calcutta recently, are given effect. The Committee has recognised the need for liaison between the Research Institute at Namkum and users of lac. The need for overseas trade publicity, particularly in the U.S.A. which consumes 60 per cent of the total export of lac from India, is also emphasised.

* * *

Two large Government-sponsored steel-producing units are to be set up in India, each with an initial capacity of 500,000 pigot tons. The Government is also giving every assistance to the industry both in its current production plans and future expansion schemes. The total production in the year 1947 (including re-rolling) is estimated at 960,000 tons. Of the estimated import requirements of 150,000 tons, however, not more than 20,000 tons has been received. As against this, the present demand for steel is estimated at 2 to 2½ million tons per year. Strenuous efforts have been made to obtain steel from Australia, the U.K. and the U.S.A. Owing to high priority demands from such countries as China, France and Italy, however, exports from the U.S.A. in 1948 are not expected to be high.

* * *

The Panel on Glass Industries appointed by the Government to inquire into the state of the glass industry has reported that the reasons for the present backward state of the industry are (1) unfair competition by well-established foreign imports, (2) failure to extend tariff protection on an adequate scale, (3) lack of sound internal organisation and (4) low technical standards and slow progress in technical developments. Recommendations include: the raising of scale and quality of output; manufacture of

new lines such as plate and optical glass; localisation; greater mechanisation; importation of experts for training purposes; setting up of State schools and institutions.

* * *

A scheme by which the rays of the sun will render sea-water suitable for irrigation purposes has been proposed by Dean Saidman, director of the Institute of Actinology, Paris, who has been invited by the Jam Sahab of Nawanagar to conduct experiments in the State of Nawanagar. Dr. Saidman has stated that geographically India was in a better position than most other countries to extract energy from the sun. A powerful solarium would be employed to raise the temperature of sea-water to boiling point, and thereafter reconvert the vapour into pure distilled water which would be conveyed to the non-cultivable arid areas by pipelines.

South African Chemicals

FULLER information has now been released relating to the acquisition by the Swiss Holder bank Financière Glanuss of control of the South African Anglo-Alpha Cement, Ltd. (C.A., January 24). The transaction involves the issue to the Swiss interests of 2,560,000 5s. shares (at 5s. 6d.) for cash and the transfer of 2,688,000 Anglo-Alpha shares in exchange for 90 per cent of the capital of National Portland Cement (Pty.), Ltd. Anglo-Alpha has given notice of its intention to redeem the whole of the existing debenture stock and to create new debentures not in excess of £1 million. Anglo-Alpha will acquire from Holderbank a proved deposit of limestone in the Ventersdorp district for £60,000. Holderbank will be appointed technical managers of Anglo-Alpha and its subsidiary, Kimberley Portland Cement. Through the acquisition of National Portland Cement, Anglo-Alpha will obtain control of the modern factory near Cape Town which has a capacity of 150,000 tons a year. As a result of the financial changes, Anglo-Alpha will obtain £704,000 fresh capital from share subscriptions, in addition to £500,000 from the issue of debentures.

* * *

Vigorous criticism of the Board of Trade and Industries was expressed by the chairman at the annual meeting of Cape Portland Cement when he defended the local cement industry from the charge that the

(Continued overleaf)

price of local cement was excessive when compared with British producers' prices. He mentioned that in 1941 the wholesale delivered price of a 94 lb. pocket in Cape Town was 2s. 3d. as against the lowest advertised delivery price in the London area in the same year of 2s. 4½d. Strong exception was taken to the publication of detailed costs of cement producers in the Board of Trade and Industries report in a form which, in his opinion, would permit anyone with some knowledge of the industry to identify the figures of the individual companies concerned, when those details were supplied to the board as confidential material.

* * *

The Government of Northern Rhodesia has banned imports, except under special import licence, from all countries except Great Britain, the British colonial territories, Burma, South Africa and Southern Rhodesia. Similar restrictions in the import of foreign goods apply in S. Rhodesia.

* * *

Australian manufacturers are introducing into South Africa a number of competitive lines of cosmetics, lotions—including those made from olive oil—and creams. These lines are at present not well known in the Union and no very strong publicity campaign has been started in connection with them, but the indications are that in the very near future an all-out effort will be made to secure a substantial portion of the business in this market. The Australian exporters have told local importers that there is a severe shortage of soda ash in the Commonwealth and thus it is impossible to pack all the perfumery lines in bottles.

* * *

Alarmist stories of the probable toxic effects on human beings which might result from the large-scale use of DDT insecticide have been discounted by the results of recent experiments at the Onderstepoort Veterinary Research Laboratory, showing that the usual concentration has no ill effect on cattle or dairy products. Dairy cattle were given doses eight times as large as normally they might inadvertently take into their system. Their milk was fed to rats. In 14 days' experiments no ill effects were observable in the cattle or the rats.

* * *

At the seventh annual general meeting of the General Chemical Corporation, Ltd., held recently at Johannesburg. Mr. David Hayden, who presided, said that the company's chairman, Mr. Sydney Hayden, accompanied by the chief chemist, had for some months been visiting England, the European Continent and America.

The purpose of the trip had been to negotiate tie-ups with leading organisations in

those areas. As a result, the company was now in a position to manufacture and market an extensive range of new products not hitherto manufactured in the Union. The experience and research of those organisations thus now at the company's disposal, together with exclusive rights for materials, processes, and trade marks, should prove of considerable benefit.

Palestine a Battle Zone

MEN of the Life Guards are on regular duty in Palestine escorting convoys of potash from the Dead Sea to Jerusalem. Work at the Dead Sea plant has, however, been reduced by half since the present disturbances began two months ago. The company formerly used 15-ton lorry-and-trailer transport but loads have been considerably reduced because of the need to do away with trailers—it was found impossible to manœuvre a lorry and trailer on the steep, narrow road from the Dead Sea in the event of ambush and the authorities prescribed that only lorries should be used.

Even with their escorts, the convoys are frequently attacked and on one occasion a convoy commander was shot and killed. The cabs of all the trucks have been armoured and similar protection has been given to vehicles which take staff to and from Jerusalem to the plant.

So far there have been no incidents among the mixed Jewish-Arab staff. On one occasion a number of Jericho Arabs tried to get jobs at the plant and some of the regular Arab staff warned the Jewish foreman that the new arrivals' purpose was to foment trouble. The newcomers were dismissed. The water-tower of the company's camp at the south of the Dead Sea was recently sabotaged in an Arab attack; that was the only untoward incident to date. The general dislocation of road traffic has also had its effect on potash shipments which have had to be severely cut.

Since the killing of 39 Jewish employees at the Consolidated Refineries in Haifa at the end of the year the plant has not been working to capacity. Extra guards have been put on and many watchmen have been replaced by British Police and troops. Attacks on rail and road transport also hamper the distribution of kerosene, benzine and fuel oils, as well as of butane gas for cooking. The vast majority of households in Palestine are completely dependent on paraffin for cooking and heating and the stoppage at the refineries combined with the interruption in transport has been severely felt.

In Jerusalem, the oil storage tanks are in an Arab zone and for some days British and other clerical staff acted as voluntary

drivers until a system was introduced whereby the Arabs drove to a "neutral" point and there the Jewish drivers took over. This, however, is almost certain to break down when the British leave. The Shell Company in Jerusalem has already appointed a Jewish and an Arab distributor in anticipation of the British withdrawal. The company has already planned to transfer its head offices from Jerusalem to Haifa which, it is expected, will be a securer headquarters.

The experiments for the de-salting of sub-soil water in Palestine have been successfully concluded at the Wietzmann Research Institute at Rohovot and two American experts who conducted the work have returned to U.S.A. Before leaving, they said that a plant would be set up shortly in one of the Jewish settlements in the southern part of Palestine (the Negev) which would ensure adequate drinking water for the whole area.

Italian Chemical Notes

STRONG demands from abroad for Italian caustic soda, which buyers gladly obtain at high prices, has recently been observed. In consequence, the black market prices of this product have risen and many concerns which secured soda for industrial purposes at the low prices fixed by law, have preferred to export rather than use it for manufacturing processes. Alarmed by these developments, the Italian Ministry of Foreign Trade has established severe licensing controls over exports of soda. In future, therefore, only *bona fide* exporters will be permitted to export this commodity.

To improve the situation of the sulphur industry, the Italian Government has decided to increase the price of sulphur by some 22.5 per cent which now averages about 27,000 lire per metric ton. The Government has signed a trade agreement with France whereby that country will purchase 30,000 tons of Italian sulphur.

The Nobel Company intends to open a new plant for the production of calcium carbide in the Province of Pescara, and in that connection to reconstruct and convert old plant destroyed during the war. The new factory will employ about 900 men, and two-thirds of its activities will be devoted to the production of carbide and its derivatives, and the remainder to the manufacture of soda and chlorine.

Italy's citric acid industry is undergoing such a severe crisis that resumed production at the Arenella and Bosurghi factories will be delayed. Financial difficulties which

prevent the purchase of raw materials are partly responsible for this. The Citrus Fruit Chamber in Italy has therefore applied to the Ministry of Industry and Trade for a subsidy of 150 million lire to be used to give sums not exceeding 50 lire on account for every kg. of calcium citrate that producers supply to the pool of the above Chamber. In its turn the Chamber would reimburse the State gradually as the sales of the citrate to industries proceed. No financial loss is anticipated, but if it should materialise, the Chamber is willing to meet it from membership contributions. The Government has accepted the proposals, and the plan will now go forward.

The Italian glass industry has now completely recovered and is producing an average of 10,750,000 square feet of glass monthly. Demand from abroad is reviving, especially from Turkey, Palestine, Holland and Sweden.

The second national meeting in Milan of the Associazione Italiana di Metallurgia (AIM) has been postponed until April 23 to 25, and will coincide with the XXVI Exhibition.

Reports from Rome state that a company called "Leo Industrie" has just been registered with a share capital of 100 million lire. Its object is the production of penicillin according to the manufacturing method employed by the Levens Kemiske Fabrik, a Danish enterprise. The production programme for the current year covers 25 million flasks at 100,000 units each. It is stated that the company's intention is to supply some eleven foreign countries after home trade requirements have been met. The Danish company is understood to have granted to the new Italian venture the sale rights for these countries. A close scientific co-operation between the two companies has also been agreed upon.

Swedish Isotopes

SWEDEN plans to increase production of a number of isotopes. A new cyclotron recently installed at the Nobel Institute for Physics Research at Frescati near Stockholm, is expected to be in full production within twelve months.

The cyclotron, which has a 400-ton magnet, is believed to be more powerful than the cyclotron at Berkeley, California, and is installed in an underground laboratory. The roof of this laboratory is covered by a large tank of water, two metres deep, which will neutralise the dangerous emanations released when the apparatus is in operation.

U.S. Atomic Policy

Wider World Distribution of Isotopes Arranged

A BROAD programme for the use of atomic energy in science and medicine, as developed during the past year, was outlined by the U.S. Atomic Energy Commission (chairman, Mr. David E. Lighthill) in its semi-annual report to Congress, made public last week. The report noted the inauguration of a \$90 million project for new research facilities, and co-operation with 200 organisations. The report surveyed the first year of activities of the Commission since transfer of the atomic energy programme from military to civilian management. Achievements include setting up of a medical board of review and an advisory committee for biology and medicine. The Commission also arranged for maximum development and distribution in the United States and abroad of isotopes for medical and biological investigations, and a programme for cancer research.

Security and Co-operation

The Commission reported that the paramount objectives of "assuring the common defence and security" as defined in the Atomic Energy Act of 1946 required a major programme of development at the Los Alamos scientific laboratory where the weapons programme is concentrated.

In furtherance of the plans announced by President Truman last September to share radio-isotopes for research with other nations, at the end of 1947 shipments had been made to users in Argentina, Australia, Denmark, and the United Kingdom. To date, as a result of requests received, the report adds, the Commission has approved future distribution to Belgium, Canada, Cuba, France, Ireland, Italy, the Netherlands, New Zealand, Peru, Sweden and the Union of South Africa.

President Truman, in making the announcement last September to the Fourth International Cancer Research Congress meeting in St. Louis, termed the decision of the Atomic Energy Commission to share the isotopes "an important forward step towards greater international co-operation in the field of medical and biological research."

The report said that the production of fissionable materials was maintained throughout the year and a general programme for expansion of capacity was started along four main lines. These were through development of new sources of raw materials, improvement of processes for the reduction of ores, renovation and expansion of facilities for the production

of fissionable materials and development of the nuclear reactor for more efficient utilisation of available fissionable material.

On aids of the Commission to science the report said: "Continued production of radio-isotopes at Clinton National Laboratory made possible a nationwide programme of tracer research in medicine, agriculture, biology, metallurgy and industrial processing. The Commission does not report on work done by the many agencies using this important research tool.

"These agencies are required to publish results of this work and some of the most significant advances in human welfare may result from work done in nearly 200 public and private institutions which last year received over 1800 shipments of radio-isotopes.

"The Commission established a division of biology and medicine to direct work done in Commission facilities in this field and to effect proper co-ordination with the work of other agencies. By the year's end the division had completed an industrial hygiene survey and laid plans for still further improvement in health protective measures.

"It had developed a programme for training of scientists and technicians in medical, biological and health physics fields, arranged for the operation of two medical and biological training centres, and completed plans for the Commission's support of cancer research."

CALIFORNIAN CYCLOTRON TO OPERATE SOON

THE 41-in. cyclotron at the University of California, Los Angeles, will be put into operation "some time this spring," according to Dr. J. R. Richardson, in charge of its construction and operation. The machine, which was moved from the university's Berkeley campus about a year ago, was built in 1930 and was the original cyclotron on which Dr. Ernest O. Lawrence did his experiments. It was also the first to be converted into a frequency modulation machine, thus rendering it almost twice as effective. It originally produced about 7 million electron volt particles against the present 15 million. When put into operation it will be used for a series of experiments on the forces which hold the nucleus together and to produce isotopes for which Dr. Clifford Garner and Dr. William MacMillan, department of chemistry, will be responsible.

Laboratory Centrifuges

Widely Adaptable English Models

THE provision of British made equipment in categories in which dependence was generally placed in the past on overseas manufacturers has been one of the most welcome post-war developments. In this category is the range of laboratory centrifuges recently introduced by Machine Shop Equipment, Ltd., which incorporates the familiar qualities of foreign designs and incorporates a number of additional facilities and developments of its own. The smallest model, the "Minor," ranks as a highly versatile piece of equipment possessing great capacity in proportion to its size. Its makers state that its maximum capacity is 200 ml., and that a wide range of accessories are freely interchangeable on both standard and angle heads, thus giving it a great variety of combinations available at short notice.

The machine has an overall height of 12 in., a diameter of 13½ in., and a base diameter of 8½ in., and is supplied in stove-enamelled finish with a 6 ft. 3-core flex. Its speed range, which is 2300 to 4500 r.p.m., is dependent on the head and number of tubes used (up to 20 8 mm. diameter glass tubes) and upon the type of current supply. In the latter connection, advise the manufacturers, D.C. supply gives a considerable increase of speed.



The "Minor" model centrifuge

New Welding Equipment

Murex Safety Device

TO minimise the danger often associated with changing the electrode or handling the electrode holder on A.C. transformer-type electric arc welding plant, Murex Welding Processes, Ltd., has perfected a piece of apparatus. It is already in production, and is expected to be marketed shortly. It is a timed relay device which operates so that within a fraction of a second after the termination of a welding run, the voltage at the electrode holder is automatically reduced from the normal 80 or 100 volts to approximately 30 volts, which is considered safe under even the most adverse conditions.

The unit is small, compact and robust, and can be attached to the tank of self-contained electric arc welding transformers, or to the reactance coils; it can be used either as portable equipment or as a wall mounting.

HIGH-SPEED ROTATION TESTS

U.S. metallurgists are using "spinning discs" as a method of testing welds and steels in a research programme now going on at Massachusetts Institute of Technology sponsored by the Welding Research Council of the Engineering Foundation. In an armour plated "whirl pit" 40 in. in diameter and 9 ft. deep, circular steel plates are rotated at high speed until they "flow." It is expected that tests will provide interesting information on plastic flow and on distribution of plastic strains. The programme outlined for the future includes:

- 1 Study of plastic flow and strain distributions on discs 26 in. in diameter rotated to partial yielding and to bursting at room temperature; on welded discs, as-welded and stress relieved; and on unwelded discs annealed and as hot rolled.

- 2 Development of wire strain gauge techniques for measurement of brittle fracture conditions at low temperatures, and construction of a refrigeration system for testing discs at low temperature.

- 3 Low temperature studies on discs of same thickness (¾ to 1 in.) unwelded, welded, stress-relieved and as-welded.

Australian Rolling Mill for Scrap.—According to a statement by the Australian Commissioner in Ceylon, an aluminium rolling mill, erected at a cost of approximately £1 million by the Government at Wangaratta, Victoria, and completed just at the end of the war, is to be broken up and the machinery sold by tender.

Increased Scope for Chemical Fibres

Celanese Corporation's Increased Production Programme

THE textile industry was literally transformed by the advent of chemical fibres, of which cellulose based rayon and nylon are the outstanding examples. That there is room both for the natural and the synthetic fibre, however, is fully recognised, even by manufacturers of the latter.

For particular purposes it has been found desirable to blend the natural with the synthetic product. Modern ways of life, more especially the tendency to wear light-weight clothing, has done much to develop this "co-operation." Research may disclose further fruitful fields.

These are among the considerations which have been studied by the Celanese Corporation of America in designing a greatly enlarged programme of chemical production to supply anticipated future demand for synthetic fibres.

Less Natural Fibre

Growing demands for the synthetic product in recent years, the Corporation believes, can be attributed as much to the effect of increasing populations as to declining production of the natural fibre consequent upon the war. In the U.S.A. another factor operates, namely, increased purchasing power. In that connection the following figures relating to U.S. rayon production for the first eleven months of 1947, are of interest. Total production of 967 million lb. was made up with 227 million lb. of viscose tyre cord yarn; 460 million lb. viscose textile yarn; and 280 million lb. cellulose acetate yarn. Corresponding figures for viscose textile yarn and cellulose acetate yarn respectively for 1939 were 267.8 million lb. and 103.3 million lb.

The following claims for chemical fibres are made: They have made possible an infinite variety of new weaves and textures having both attractiveness and greater

utility and have greatly lengthened selling seasons.

Chemical fibres offer competitive price advantages over the natural fibres, particularly in recent markets. For example on January 7, 1948, Celanese 150 denier filament yarn was 74 cents per lb.; comparable textile yarns of natural fibres were \$1 per lb. for cotton yarn, \$3.25 per lb. for worsted yarn.

Due to crop conditions, speculative influences and other market factors, the natural fibres are subject to wide price fluctuations. By contrast, the chemical fibres are remarkably stable in price.

Although there is as yet no competition between natural and the synthetic products, largely because of the world textile shortage, and to some extent also because the disparity in qualities (favouring natural) is counterbalanced by production costs (favouring chemical), some antagonism may ultimately occur. This possibility has not been overlooked by the Celanese Corporation, for it has announced a long-range programme for the production and sale of chemical fibres.

Petroleum Chemicals

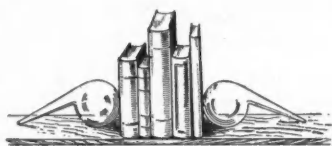
The company plans to produce the major chemicals required for the manufacture of cellulose acetate. This will be carried out at Bishop, Texas, using petroleum gases as the raw material for the acetic acid and the acetone. It is also proposed to manufacture a substantial part of the increased requirements of cellulose. Steps are also being taken to obtain additional supplies of cellulose recognition of the world shortage of wood pulp. More plant for manufacturing cellulose acetate yarn, and technological improvements to existing plant are also envisaged.

Nylon for Shipping

Nylon hawsers have been used successfully on the Clyde, replacing manilla of heavier type which was found unsuitable for the purpose. In this particular instance a 12 in. manilla hawser, used as a mooring cable was parted repeatedly when the back-wash of passing vessels shifted the moored ship. An 8 in. nylon cable was used and has proved completely satisfactory, the nylon having a degree of elasticity which prevents snapping, and the additional advantage of considerably reduced weight.

Betro's Commercial Envoy

The Betro organisation, 48 Dover Street London, W.1, announces that the services of Mr. Wilfred Sloane are available to all exporters who require general market data, information on price structure, competition, agents, etc., for their particular goods in Turkey, Iraq and Iran. This offer is, of course, subject to the priority requirements of Betro's subscribing members. Mr. Sloane, who was born in Turkey and has intimate associations with the Middle East countries, leaves for that area early next month to carry out commissions



A CHEMIST'S BOOKSHELF

A Text-book of Practical Organic Chemistry.
Arthur I. Vogel. London, Longmans,
Green and Co. 1948. Pp. XXIII+1012.
42s. net.

The author, head of the Chemistry Department of Woolwich Polytechnic, and well known by his previous text-books on qualitative chemical analysis and on quantitative inorganic analysis, presents this new book on practical organic analysis, including qualitative organic analysis, to meet the requirements of students and to serve as an intermediate reference book for practising organic chemists. The book, which is concerned with both preparations and analysis, is divided into eleven chapters with numerous subdivisions. It opens with a chapter on the theory underlying the technique of the chief operations of practical organic chemistry, and assumes the knowledge, on the part of the reader, of the appropriate theoretical principles. Chapter II is devoted to a detailed discussion of experimental technique. The student is unlikely to employ very many of the operations described, but a knowledge of their existence is certainly desirable for the advanced student. Chapters III and IV are confined to the preparation and properties of aliphatic compounds and aromatic compounds respectively, and a short theoretical introduction precedes the detailed preparations of the various classes of organic compounds. This provides the opportunity of introducing the reactions and the methods of characterisation of the various classes of organic compounds. Chapters V-X deal respectively with heterocyclic and alicyclic compounds; miscellaneous reactions; organic reagents in inorganic and organic chemistry; dyestuffs, indicators and related compounds; physiologically-active compounds; and synthetic polymers. Chapter XI is devoted to qualitative organic analysis. Considerable practical value attaches to the numerous references and the list of firms supplying the specialised apparatus which, after much development research and exhaustive tests, assisted the work of the author. The book contains, moreover, many diagrams, eight photographs and a comprehensive appendix which refers to the literature of organic chemistry. These and a detailed subject index complete a book which reflects principally the fruits of the very wide experience

in research and teaching of the subject, and will provide a satisfactory course of study in this important branch of chemistry.

The Terpenes. Vol. I. Simonsen and Owen. London: Cambridge University Press. 1947. 2nd Edition. Pp. 479. 30s.

The publication in 1931 of Simonsen's book on the terpenes provided chemists with a masterly account of the reactions of this interesting class of compounds, an event which was particularly welcome since there was no publication in the English language dealing with the subject, although there had been earlier works concerned with the extraction and uses of these substances. One of the continuing tasks for the organic chemist is the unravelling of nature's mysteries; to deduce the constitution of naturally occurring substances and then to produce them synthetically in the laboratory. In recent years interest in the examination of natural products has again increased and for this reason alone it is useful to have a revised edition of this now standard work. The decade and a half which has elapsed since the first edition has not been distinguished by any spectacular advances in the field of the simple acyclic and monocyclic terpenes which are covered by volume I. On the other hand, there has been a general improvement in practical technique and new tools have been developed for probing the structure of natural products. Of these may be mentioned catalytic hydrogenation and the use of absorption spectra. Owing to these practical advances new syntheses have been developed including one for ascaridole by reactions which may throw some light on the mechanism of the formation of this substance in nature. Terpene chemistry is complicated by the fact that so many of the individual substances are optically active and therefore may exist in two forms, while others again may exist as geometrical isomers. One of the most noteworthy advances in the last few years has been the elucidation of the stereochemistry of the menthols by Read and his co-workers, who have devised methods for their resolution. This same investigator has also been responsible for the separation of *cis* and *trans* carvool. Great interest has always centred around the

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ionones, generated by their technical importance, but these substances now have a fresh claim to notice as they have been used for syntheses in the vitamin A series and for other polyenes. It may be recorded that in the course of this work a method was developed for the cyclisation of pseudo-ionone semicarbazone with phosphoric acid to give almost pure β -ionone, which is regenerated from the semicarbazone by dilute sulphuric acid. In addition, the products obtained by graded reduction of the ionones have been studied by other workers. Fuller information on all these matters is to be found in this new edition of *The Terpenes* and it is evident that the revision has been extremely thorough. In all cases, where possible, the literature has been consulted up to the end of 1945 and in some cases it has been found practicable to review it to the end of the following year. One of the main purposes of a standard work such as this is the provision of references to facilitate further reading and it is therefore a great pity to find that the publishers have not adopted the system of numbered footnotes, thus detracting from an otherwise excellent publication. It is understood that a revised and enlarged second edition is in the course of preparation.

Humour and Humanism in Chemistry. John Read, F.R.S., 1947. G. Bell & Sons, Ltd. Pp. XXIII + 368; 21s.

The capacity for disengaging oneself from the specific to be able to see as a whole so vast a canvas as the birth and development of present-day chemistry is a gift bestowed on few. Dr. John Read, among those few, is exceptionally blessed, having in a very highly developed form the ability to translate the story of aspiration, trial and error from alchemy to the bases of modern chemical science into terms at once richly amusing and readily intelligible to all. As Professor of Chemistry at the University of St. Andrews, Dr. Read is especially well qualified to give a well-balanced study of the value of the achievement of the early experimenters, and particularly of those in Scotland, which, with its close affinities with the Continent and the patronage and occasional physical participation of King James IV, was the scene of much pioneer study. The fact that most of this was associated with the quest for the Philosopher's Stone and the transmutation of base metals into gold does not detract from the value of many important principles brought to light in the course of those occasionally fantastic experiments. Dr. Read deals with these personalities and with their

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Official Notices

Lactic Casein Price Reduction.—The Director of Sundry Materials, Board of Trade, 10 Old Jewry, London, E.C.2, announces that as from February 2, 1948 selling prices of lactic casein, distributed through the Lactic Casein Importers' Association will be reduced by £47 10s. per ton. The new price schedule is as follows:

Mesh	1 ton and over	under 1 ton
90	£147 10s.	£152 10s.
60	£142 10s.	£147 10s.
30	£142 10s.	£147 10s.
Soluble	£152 10s.	£157 10s.

Under 1 bag 3s. 6d. per kilo.
All these prices are nett ex warehouse.

New Nitrate Price.—The new price authorised by the Board of Trade for Chilean nitrate of soda of industrial refined quality, which came into force on February 2, is £9 15s. for six-ton lots delivered to the nearest railway station.

Prices of Oils and Fats.—The Ministry of Food announces that no changes will be made in the prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four weeks ending February 28.

Argentina Zinc Import Duty Change.—Zinc in bars and ingots may enter Argentina duty-free if used for the manufacture of zinc oxide.

FOOD STANDARDS COMMITTEE

THE Minister of Food has announced the appointment of a Food Standards Committee with power to review the composition of foods (other than liquid milk) and to recommend food standards, based on quality and nutritional value, designed to protect the consumer against the sale of inferior products. The following have been appointed to the committee: Chairman, Dr. Norman C. Wright, Chief Scientific Adviser to the Ministry of Food; vice-chairman, Mr. G. G. Barnes; Mr. C. A. Adams, Mr. P. N. R. Butcher, Prof. S. G. Cowell, Sir Jack C. Drummond, Mr. A. Glover, Sir Harry Hague, Sir Harry Jephcott, Dr. J. M. Johnston, Dr. G. W. Monier-Williams, Dr. J. R. Nichols, Mr. R. W. Sutton, Mr. G. Taylor, Mr. K. R. Allen has been appointed secretary.

better known successors in the quest for chemical truths with a very lively sense of humour and a mature appreciation of the human problems involved. The volume is richly decorated with contemporary woodcuts, etchings and ultimately photographs of the *dramatis personae* and their environment.

Home News Items

Five Weeks' Coal Total.—Coal production in the week ended February 7, fell to 4,052,700 tons (from 4,139,300 the previous week). In the first five weeks of this year 20,493,300 tons have been mined, comparing with 18,978,600 in the same period of 1947.

Long Service at Dunlop's.—Long service badges have been presented by Mr. R. C. Davies, works manager, to 112 employees with over 15 years' service at the Dunlop Rubber Company's factory in Walton, Liverpool. One of them, Mr. John Kilmartin (mill room) has served 62 years and six others more than 40 years.

Lethal Toy Caps.—Toy percussion caps are believed by the police to have been the cause of a fatal explosion last week at Islington, Liverpool, by which the whole of the front of a shop was blown out. A boy of nine, who is stated to have kept some of the caps in a cellar, was killed and a woman and two other children were removed to hospital.

Merger Recommended.—Simultaneous announcements by the Institution of Factory Managers and the Institution of Works Managers state that, as a result of negotiations since November, 1947, the amalgamation of the two organisations has been provisionally arranged. The two bodies are to call general meetings to explain these proposals, "and each Council will strongly recommend acceptance."

Nitrogen Trichloride in Flour.—A recent statement attributed to Sir Edward Mellanby, secretary of the Medical Research Council, that nitrogen trichloride as a bleaching agent for flour, was causing ill-health, is the subject of a comment from the National Association of British and Irish Millers. It says that the flour-milling industry, which has been conducting research into this matter and keeping Government departments informed, has itself no knowledge of any outcome, and "deprecates any unnecessary alarm which may be caused among the public."

New Wage Rates.—The Ministry of Labour Gazette records three sectional wage increases having taken effect in December affecting chemical workers. Workers in heavy chemicals, chemical fertilisers and the chemical processes of the plastics industry received an increase of 1½d. per hour in minimum rates and of 2½d. for youths of 19-21. The new minimum rate for adults in the London area is 2s. 3d. per hour. Minimum time rates in the drugs and fine chemicals industry were raised as follows: Men 6s., women 5s., youth 4s. to 9s. 6d. (according to age), girls 3s. 6d. to 7s. 6d.

Chemists Visit Vauxhall Motors.—Members of the London Section of the Oil and Colour Chemists' Association were entertained on January 29 by Vauxhall Motors, Ltd., at its Luton works, where, after a lunch, parties of ten with guides were conducted on a tour of inspection.

Nearly 1 Million New Telephones.—In 1910 there were 510,599 telephones in the United Kingdom. In 1930 the number had grown to 1,895,740, and in 1947 there were 4,318,816. The record number of 832,101 telephones were installed by the Post Office during the year ended March 31 last, compared with 365,114 in 1936.

Electricity and Water Savings.—Among economies effected during 1947 at the Stork Margarine Works, Bromborough, for which credit is given to propaganda and the use of a works suggestion scheme, were the following: Electricity for lighting, 30 per cent; power used per ton of margarine produced, 4 per cent; gas consumption, 8 per cent; water consumption, 25 per cent.

Scottish Bitumen Development.—Production of bitumen and allied products in the North of Scotland is proposed by British Emulsion, Ltd., of Glasgow, which has already applied to the Ross and Cromarty Town Council for a site. Representatives of the firm are understood to be going north to inspect a site at Dalmore where there is a pier to facilitate despatch by tanker to the Cromarty Firth.

No More Aircraft Aluminium.—The Minister of Supply announces that the recovery of secondary aluminium ingot from crashed aircraft scrap, which has been carried on since 1943 under the management of Morris Motors, Ltd., at No. 2 Metal and Produce Recovery Depot at Eaglescliffe, Co. Durham, will come to an end at that depot at the beginning of April of this year. There is no longer enough scrap to keep the depot in operation.

I.C.I. Long-Service Awards.—Sixty-eight long-service employees of Imperial Chemical Industries (Paints), Ltd., were honoured at a social given by the firm's Recreational Club at the Dolphin Hotel, Slough, last week. Among recipients of awards (inscribed gold watches) were Mr. Edward Clayton and Mr. John Nelson Chamberlain. Each had been with I.C.I. or its predecessors. Eight other employees received awards for 30 years' service, and 58 for periods of 20 years with the firm. The presentations were made by Mr. G. Y. F. Campbell, chairman of the Paints Division.

Next Week's Events

MONDAY, FEBRUARY 16

Society of Chemical Industry (London Section). Royal Institution, Albemarle Street, Piccadilly, W.1, 6.30 p.m. H. W. Cremer: "Water: A National Asset" (Jubilee Memorial Lecture).

Birmingham University Chemical Society. University, Edgbaston, Birmingham, 4.30 p.m. Mr. G. Waggett: "The Chemist and The Textile Industries."

TUESDAY, FEBRUARY 17

Society of Chemical Industry (Agriculture Group): Chemistry Department, Royal College of Science, Imperial Institute Road, S.W.7, 2.30 p.m. T. Wallace: "Methods of Determining Mineral Deficiencies in Plants"; D. J. D. Nicholas: "Chemical Tissue Tests for the Determination of Mineral Status of Plants." (Chemical Engineering Group): Geological Society, Burlington House, Piccadilly, W.1, 5.30 p.m. C. J. Virden and J. L. McCowen: "Recent Developments in Brewery Plant and Equipment in Scandinavia and U.S.A." (Food Group): Gas Showrooms, Town Hall Annex, Manchester, 10.30 a.m. F. C. White: "New Developments in the German Dairy Industry"; H. J. Bunker: "Wartime Production of Food Yeast in Germany." 2.30 p.m., J. F. Hearne: "German Albumen Substitutes"; R. Perdue: "German Soapless Detergents."

Institution of Rubber Industry. Caxton Hall, Caxton Street, S.W.1, 7.0 p.m. Latex "Quiz."

WEDNESDAY, FEBRUARY 18

Institute of Welding (North London Branch). South-West Essex Technical College, Walthamstow, 7.30 p.m. Question Night.

Royal Institute of Chemistry. Wellcome Research Institution, 183 Euston Road, N.W.1, 7.30 p.m. Lionel Heald: "Function of the Expert Witness in Litigation."

Midland Chemists' Committee. The University, Edmund Street, Birmingham, 6.30 p.m. Dr. W. T. Parker: "Recent Advances in Building Research—Some Chemical Aspects."

THURSDAY, FEBRUARY 19

Royal Institute of Chemistry (Hull and District Section), Chemical Society and University College Scientific Society. University College, Hull, 6 p.m. Prof. E. G. Cox: "The Optical Properties of Molecules."

Chemical Society. Burlington House, Piccadilly, W.1, 7.30 p.m. Sir Edward Mellanby: "Sir Frederick Gowland Hopkins Memorial Lecture." (Nottingham Section). Chemistry Lecture Theatre, University

College, Nottingham, 6.0 p.m. Prof. E. R. H. Jones: "Synthesis in the Vitamin A Field."

FRIDAY, FEBRUARY 20

Royal Institute of Chemistry. Chemical Laboratory, Cambridge University, Pembroke Street, Cambridge, 8.15 p.m. Dr. F. A. Freeth: "Relationship Between Academic and Industrial Research."

Textile Institute (Dublin Section). Mansion House, Dublin, 7.30 p.m. A. Nisket: "Emulsions and their Use in the Textile industry."

Chemical Society (Glasgow Section). Royal Technical College, Glasgow, 7.0 p.m. Annual General Meeting.

SATURDAY, FEBRUARY 21

Institution of Chemical Engineers (N.W. Branch). College of Technology, Manchester, 3.0 p.m. P. Hamer: "Water Treatment."

GROUNDNUT SCHEME ADVISERS

DERBYSHIRE Stone, Ltd., of Matlock Downers and operators of limestone quarries in Derbyshire and Staffordshire and large producers of ground limestone for agricultural purposes, is to act as adviser to United Africa Co. (Managing Agency), Ltd., in the development of approximately 600 square miles of land in Tanganyika, East Africa, for the cultivation of groundnuts. Two of the company's technicians, Mr. A. E. Cotterell and Mr. R. J. Ball, have left England by air for Tanganyika to study the local limestone deposits which have been surveyed. From its report, Derbyshire Stone, Ltd., will advise on the most effective methods of opening and developing limestone quarries, on the installation of suitable plant and machinery for producing the ground limestone, and on its subsequent application to the soil.

£1m. Stock Issue

Johnson, Matthey & Co., Ltd., bullion refiners and specialists in precious and other metals have decided to issue at once £1 million 3½ per cent unsecured convertible loan stock at £98½ per cent. The additional capital will be used to equip new factories and to enable increases to be made in reserves of precious and other metals and other stores. Holders of the £248,444, 4 per cent mortgage debenture stock, which is due for redemption at the end of March, will be offered an equivalent value of the new loan stock on the basis of £100 per £100 plus a capital cash payment of £1 10s.

PERSONAL

MR. N. T. WILLIAMS has been appointed a director of Aspro, Ltd., in succession to the late Dr. F. S. Clark.

MR. MARCUS N. STATON, 79 Dene Avenue, Hounslow, Middlesex, has been appointed technical representative to S. Briggs & Co., Ltd.

MR. H. N. WHITE, Dunlop's overseas production adviser since 1944, has been appointed to the local board at Fort Dunlop.

MR. J. D. NUTTALL has been appointed secretary to Triplex Safety Glass Co., Ltd., in succession to Miss Daisy McDuell who recently retired.

MR. PHILIP J. BATE, who has been connected with Carlless, Capel & Leonard for many years, has joined the board of H. Gelpke, Ltd., London, E.C.3, as joint managing director.

LT.-COL. ERNEST BRIGGS, of Boxford, Suffolk, late chairman of Lever Brothers, Port Sunlight, Ltd., a director of Benjamin Brooke & Co., Ltd., R. S. Hudson, Ltd., and the Vinolia Co., Ltd., left £57,207 (net £39,167).

MR. GEOFFREY HEYWORTH, chairman of Lever Bros. and Unilever, Ltd., will serve on a committee appointed by the President of the Board of Trade to assist in a consultative capacity in the administration of the Companies Acts.

MR. W. L. BOON has been appointed managing director (fuel utilisation) of Powell Duffryn Technical Services, Ltd. MR. D. G. HEMMANT and MR. R. L. LECHMERE-OERTEL have been appointed managing directors (mining) of the same company.

MR. JOSEPH WALTON, an assistant managing director of Thos. W. Ward, Ltd., Albion Works, Sheffield, has been appointed chairman and managing director of the Darlington Railway Plant and Foundry Co., Ltd.; MR. PHILLIP T. WARD has been appointed a director of the Darlington company.

DR. R. G. JAMES, technical manager of the Lastex Yarn and Lactron Thread Co., St. Mary's Mills, Leicester, who has served as a chemist with the Dunlop Rubber Company for some 20 years, has been appointed factory manager of this company, operating at Fort Dunlop in succession to MR. JOHN HEALEY, who recently retired after 40 years service. MR. A. R. BLOKHAM, who for the last 16 years has been responsible for the production of lastex yarn and lactron thread, becomes works manager of the company.

MR. J. P. D. COLEMAN, works director of Wild-Barfield Electric Furnaces, Ltd., since 1933, and from 1938 a director of its associated company, G.W.B. Electric Furnaces, Ltd., has retired owing to ill-health. During the recent war, he served for a short time with the R.N. motor fishing vessels in which his earlier sea-going experience was of value. In 1945, he gave up active day-to-day participation in the business but remained on the boards of both companies. His wide mechanical and electrical knowledge were of great value to development in the period following the 1914-18 war of the firm's heat treatment equipments, many of which still bear the impress of his ideas.

B.I.F. Deputy Director

Because of the increasing responsibilities of the director of the B.I.F. (MR. R. E. G. MOORE), the Export Promotion Department of the Board of Trade has appointed MR. W. H. YOUNG, who has been associated with the organisation of the B.I.F. in London since 1922, to be deputy director of the Fair.

Leather Chemists' Appointments

The appointment of the following provisional officers has been announced by the International Union of Leather Chemists' Societies: President, PROF. DR. P. CHAM-BARD; first vice-president, MR. R. BLOCKEY; second vice-president, MR. J. MALLEBAY; hon. treasurer, MR. W. R. ATKIN; hon. secretary, MR. A. HARVEY.

Obituary

MR. RICHARD AIREY, a director of International Paint and Compositions Co., has died at his home, Billingham, Sussex.

MR. ARTHUR HERBERT CLARK, of Great Sankey, Warrington, fuel manager of Joseph Crosfield & Sons, Ltd., at Warrington, has died, aged 58.

MR. AUGUST C. KLEIN, whose death in Jamaica at the age of 60 was announced last week, played an important rôle in forwarding the development of the atomic bomb. Vice-president of the Stone & Webster Engineering Corporation, of Boston, Massachusetts, he was appointed co-ordinator of the engineering requirements of the project and was responsible for the design of the electro-magnetic uranium plant.

Fountain Pens Decontrolled.—Fountain pens have been freed from price control as from February 9.

Technical Publications

SUCCESS or failure in the commercial operation of a manufacturing business can depend upon a number of factors, not the least important of which is the use of a sound stock control system based on accurate and up-to-date records. The need for this is all the more apparent when it is remembered that in many factories the cost of materials often represents more than 60 per cent of the value of the finished products. This is the note upon which Mr. W. Gildon introduces his booklet "Stock Control." Writing as one with considerable experience of his subject, Mr. Gildon has produced a book worthy of study by all who are responsible for heavy industrial stocks. It is produced by the Purchasing Officers' Association, 17/18 Henrietta Street, W.C.2. price 2s.

* * *

Of interest to ironfounders and others concerned with the manufacture of iron and steel, is the *Bulletin* of the British Cast Iron Research Association, of which the January (Vol. 9, No. 4) issue is now available. Included among many interesting matters dealt with are more than 100 abstracts and patents. Copies are obtainable from the Council of the Association, Alvechurch, Birmingham.

* * *

A useful guide to the use of tar on road surfaces is the British Road Tar Association's "Code of Practice for Surface Dressing with Tar," obtainable from the Association's offices, 1 Grosvenor Place, S.W.1.

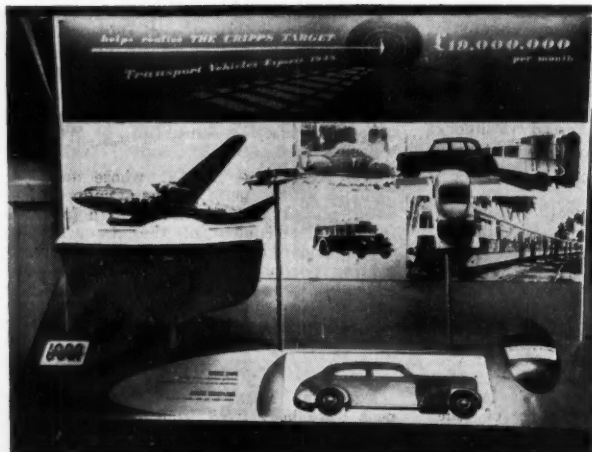
An interesting account of an experiment in which pyrethrum dust was used to protect grain against weevils and other grain beetles has been prepared by Dr. V. A. Beckley, senior chemist of the Scott Agricultural Laboratories, Department of Agriculture, Nairobi, Kenya Colony. Although essentially of a preliminary character, the report states that results so far achieved are striking.

* * *

Chemical engineers and others whose duty it is to advise upon the production of chemicals, and the purchase and installation of plant, will be interested in the chemical stoneware catalogue, Section 1—Towers and Accessories, which experts of Doulton & Co., Ltd., have prepared for the chemical industry. It contains a wealth of information.

* * *

Valuable contributions to the literature of theoretical and experimental research in the fields of chemistry and physics are to be found in Philips Research Reports, of which the latest (Vol. 2, No. 3) has just been released. Among the seven papers presented, are those dealing with "Influence of Cooling Conditions on High-Pressure Discharges," "Photoluminescence," and "Reaction between Carbon and Oxygen in Liquid Iron." All reports are based on experimental work conducted at N. V. Philips' Gloeilampenfabrieken, Eindhoven, Holland, and copies can be obtained from Philips Electrical, Ltd., London, price 6s.



Importance of "Finish"

Speaking at the Charing Cross Hotel on the occasion of the recent opening of a paint display by Imperial Chemical Industries, Ltd., Mr. A. G. Bottomley, Secretary for Overseas Trade, said that craftsmanship, design and finish were the traditional features upon which our overseas trade had been built. Every exhibit on show, of which the one shown here was concerned with transport, emphasised the benefit to export trade of good finish

Overseas News Items

Self-Sealing (Tubeless) Tyres.—A U.S. (Akron) firm is reported to have marketed a tubeless car tyre, which seals itself when punctured.

Swedish Ore for German Steel.—Some 1,400,000 tons of Swedish iron ore have been bought in Stockholm for immediate delivery to the German steel industry.

Malayan Tin.—During December, output of the Malayan Union of tin concentrates, in terms of metal converted at 75.5 per cent, amounted to 3390 tons.

Leipzig Fair, 1948.—Chemicals will be well represented at the Leipzig Fair, March 2 to 7. Some 400 drug and pharmaceutical firms will be exhibiting as well as manufacturers of machinery, machine-tools, optical instruments, and consumer goods.

Australian Zinc Recovery.—It is anticipated that the electric power station to be constructed at Port Augusta, South Australia, will permit the recovery of nearly £20 millions worth of zinc from the slag dump at Port Pirrie. There are reported to be $5\frac{1}{2}$ million tons of 18 per cent pure zinc in the dump.

Buna Rubber in Russian Zone.—Buna output at the Schopau works in the Russian zone of Germany is stated to have increased from about 2000 tons per month at the end of 1946 to the present level of some 3000 tons per month. As processing capacity in the zone is limited, supply is stated to exceed demand.

Russian Oil Developments.—Petroleum is reported to have been found in the Moscow region at Kaluga, north of the Russian capital. It was discovered at a depth of about 196 feet in the Devonian strata, the structure and age of which is stated to be similar to the oil-bearing layers of Samara, Southern Russia. Prospecting for natural gas is also stated to be in progress near Moscow, at Boravsk, Yasnaya, Polyana, near Tula and in the Kalinin Oblast.

Canada's Hydro-Electric Programme.—The annual review of water-power development and hydro-electric distribution in Canada, emphasises the growing demand for hydro-electric energy and the great programme of construction now under way. Demand for primary power is now nearly 90 per cent above that of 1939. New installations coming into operation during 1947, while somewhat lower than the normal pre-war rate of increase, totalled 178,800 h.p.; plants now under active construction are expected to add about 500,000 h.p. during 1948. Altogether, about 2 million h.p. are to be added to the hydraulic generating capacity of the country.

German Potash for U.S.A.—According to reports from New York, sulphate of potash from the Russian zone of Germany is to be imported at a price of about \$1.20 per unit.

Palm Oil Production.—Last year's palm oil output in the Belgian Congo is estimated at about 85,000 metric tons, some 15,000 tons more than before the war.

New U.S. Protective Coating.—The U.S. firm of Spencer Kellogg & Sons, Inc., claims to have developed a new coating based on soya bean oil and styrene; it is said to dry within three hours.

Ceylon Ends Petrol Rationing.—The Ceylon Minister of Transport and Works has announced that petrol rationing in the Island has ceased as from February 1, when control of car purchases was also removed.

Canada's Higher Steel Output.—Production of steel ingots in Canada last year amounted to 2,854,532 tons compared with 2,253,437 tons in 1946. The daily average was 7821 tons, compared with 6174 tons a year before, when a strike affected production.

Dutch Cellulose By-products Plant.—The N.V. Cellulose Production is reported to have recently started work on its plant at Deventer. The company has concluded a licence agreement with the U.S. Viscose Corporation covering the supply of technical staff.

Italian Oil Search.—The A.G.I.P. (Azienda Generale Italiana Petroli) and the Standard Oil Company are reported to be carrying out joint oil drilling operations in the Piazzena area of Northern Italy. The companies' experts consider that the prospects of finding oil in this region are good.

New Spanish Chemical Plans.—An output of 30,000 kg. of hydrochloric acid and 40,000 kg. of alkalis is planned by Alberto Maso Pujol, Barcelona. Another Barcelona firm, Angel Masso Diaz, intends to manufacture 20 tons p.a. of synthetic (vinylene-type) resins. Butanol and acetone are to be made by Felipe Pinto Badia, Manresa. Aerosol, S.A., also of Barcelona, will establish a D.D.T. plant to make 100 litres/hour.

Rising Canadian Imports.—In 10 months of 1947 (January-October) Canada's imports exceeded the corresponding total for the whole of the previous year. The value for the 10 months was \$2,150,700,000 compared with \$1,927,300,000 in the twelve previous months. A comparison of 10 months total values of chemical imports in 1938, 1946 and 1947 is represented by the values 28.8, 76.3 and 94.8 (1947).

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

W. R. PRIOR & CO., LTD., London, W., scientific instrument manufacturers. (M., 14/2/48.) January 9, £1600 mortgage, to Borough of Marylebone Permanent Building Society; charged on land near Dunmow Road, Bishops Stortford. *—, August 16, 1947.

BRITISH GLUES & CHEMICALS LTD., Welwyn Garden City. (M., 14/2/48.) January 7, £50,000 debenture, to B. G. C. Trustees, Ltd., trustees of company's pension fund; general charge. *Nil. August 13, 1947.

GEORGE GADD & CO., LTD., Tipton, iron and steel manufacturers. (M., 14/2/48.) January 16, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Church Lane Iron & Steel Works, Tipton, and storage ground adjoining, and Woodside Works, Blackbrook Road, and Pedmore Road, Woodside, Dudley, with machinery, fixtures, etc., and general charge. *£8,500. August 13, 1947.

Satisfactions

MATTHIAS SPENCER & SONS, LTD., Sheffield, steel manufacturers. (M.S., 14/2/48.) Satisfaction January 19, of debentures registered March 8, 1939.

ENGLISH STEEL CORPORATION, LTD., Sheffield. (M.S., 14/2/48.) Satisfaction January 14, of Trust Deed registered October 7, 1932, and supplemental deeds thereto registered January 16, 1935, and December 1, 1936, to the extent of £24,993.

Company News

The nominal capital of **Peroxide Development, Ltd.**, 2 Caxton Street, London, S.W.1, has been increased beyond the registered capital of £1000, by £6000, in £1 shares.

The nominal capital of **Barrywald Products, Ltd.**, manufacturers of electrical and chemical equipment, etc., 1 Leadenhall Street, London, E.C.3, has been increased beyond the registered capital of £6500, by £6000, in £1 ordinary shares.

Eno Proprietaries, Ltd., a subsidiary of the Beecham Group, Ltd., has offered to purchase the entire share capital of Yeast-Vite, Ltd., and the deferred ordinary shares of Veno Drug Co., Ltd., two other subsidiaries of the group.

The nominal capital of **West Norfolk Farmers' Manure and Chemical Co-operative Co., Ltd.**, Wisbech Road, Kings Lynn, has been increased beyond the registered capital of £350,000, by £350,000, in 150,000 4½ per cent cumulative preference and 200,000 ordinary shares of £1 each.

New Companies Registered

Chemical & Mineral Trading Co., Ltd. (449,059).—Private company. Capital £100. First director: E. J. Adams. Secretary: E. Pocklington. Reg. office: 3 Duke Street Hill, S.E.1.

Laboratory Suppliers, Ltd. (448,843).—Private company. Capital £100. Chemical and general laboratory outfitters, furnishers and specialists, etc. Solicitors: Ferris Roberts & Co., 17 Leeland Mansions, Leeland Road, W.13.

Cadulac Chemicals, Ltd. (449,058).—Private company. Capital £5000. To acquire the business of chemical manufacturers carried on by Cadulac Chemicals at Radcliffe, Manchester. Directors: L. V. A. Hutchison and C. W. R. Hutchison. Reg. office: Wright Street, Radcliffe, nr. Manchester.

Lantigen Laboratories (England), Ltd. (449,077).—Private company. Capital £10,000. Manufacturers and refiners of vaccines, sera, pharmaceutical, medicinal, chemical and industrial preparations, etc. Subscribers: Mrs. Jean G. Stanners and J. D. Stanners. Directors: A. W. Uther, N. L. Manning, and J. K. Cutler. Reg. office: "Pinewood," College Road, Bagshot, Surrey.

Chemical and Allied Stocks and Shares

FOLLOWING the uncertainty arising from devaluation of the French franc, stock markets have encountered fresh shocks; Sir Stafford Cripps' warnings regarding export trade, dollar shortages and the inflation danger, have coincided with a sharp break in American commodity prices.

As is usual in periods of complexity and uncertainty, stock market values have reacted sharply, due largely to marking down by jobbers, although there was a fair amount of selling. All sections of the industrial market were affected, declines on balance ranging down to 7s., the chief suf-

holders being shares of companies which the market had assumed offered prospects of higher dividends. In this connection, iron and steels were subject to selling in view of dwindling hopes of higher distributions. The City is convinced that the next Budget will be drastic, but that whereas there may be no definite legislation to prevent increasing wages, there may be a sharp increase in the Profits Tax to a level which would not only prevent higher dividends, but might in many instances force reduced payments. It is true that financial results issued this year have shown higher profits, but this has arisen in a large measure from decreased tax changes, results now coming to hand being often the first to reflect the end of E.P.T.

In accordance with the general tendency, Imperial Chemical have come back to 47s. 6d., Monsanto Chemicals fell heavily to 57s. 6d., Fisons were only 67s. 6d., and at the time of writing, Amber Chemical 2s. shares have receded to 10s. In other directions, B. Laporte changed hands around 90s., the units of the Distillers Co. receded to 27s. 6d., while United Molasses were down to 50s., and Turner & Newall only 80s.

In contrast, British Funds developed further strength, the assumption being that the £150 million pay-out money arising from the sale of the Argentine railways will be largely re-invested in gilt-edged stocks.

Borax Consolidated, despite higher dividend hopes, receded to 53s. 9d., while Blythe Colour, also the subject of market hopes of a higher dividend, lost ground with the surrounding trend, and changed hands around 63s. 9d. British Oxygen fell to 93s. 9d., and British Aluminium to 52s. Elsewhere, Amalgamated Metal came back to 18s. 9d. after their recent rise, and Imperial Smelting were 22s. 6d. Among iron and steels, United Steel reacted to 27s. 3d., Dorman Long to 29s. 3d., Stewarts & Lloyds to 53s. 6d., while Babcock & Wilcox were down to 67s., and Tube Investments £6½. Glaxo Laboratories fell to £19½.

Boots Drug were back to 57s. 6d., with Beechams deferred 19s. 6d., Sangers 34s., and Timothy Whites 42s. 3d. The set-back in U.S. commodity prices affected base metal and other commodity shares, including oils, which fell heavily in some cases with Anglo-Iranian 7s. 6d. down at £8 13/16, Shells only 79s. 4½d. at one time, Burmah Oil 75s., and Wakefields down to 70s. It should be pointed out that the heavy fall in prices was due as much to the absence of buyers as to selling. In fact the latter was not particularly heavy, jobbers adopting the precautionary measure of marking prices down sharply.

British Chemical Prices

Market Reports

A STRONG demand and a firm price position characterise most sections of the industrial chemicals market. New business during the past week has been on a fair scale with little or no diminution in the value of export inquiry, and consumers' delivery specifications under existing commitments have been fully up to schedule. The demand for textile chemicals has been brisk, but supplies of soda ash continue below current requirements. The call for paint raw materials has also been strong with the white and red leads in active request. Permanganate of potash has an active market, and there is a ready outlet for available supplies of the potash compounds generally. The only feature in an unchanged and firm coal-tar products market is the continuous demand for pitch both for home and export.

MANCHESTER.—Steady trading conditions have been reported on the Manchester chemical market during the week. Existing orders for the alkalis and other leading "heavies" are being drawn against in good quantities, especially by textile bleaching, dyeing and finishing trades, and replacement buying from this and other branches of the consuming trades has been on steady lines. The soda, potash and ammonia compounds are practically all in brisk demand on home trade account, and a fresh flow of inquiries for a fairly wide range of products from shippers has also been reported. There has been little or no change in the position of the tar products compared with recent weeks, a ready outlet being found for the majority of light and heavy materials.

GLASGOW.—In the Scottish chemical market, home trade demand for all classes of chemicals has been well maintained and the delivery position of some of the materials has improved considerably. There is still a tendency for prices to rise, the biggest increase being in the price of zinc oxide, due to the recent Government increase in price of zinc spelter. Export market conditions are gradually improving and inquiries are being received for materials which previously had been purchased only from the dollar area. Import licences for materials being bought from the sterling area now seem to be easier to obtain. A number of satisfactory orders have been received and there seems every likelihood that the number of orders secured will be increased week by week up to the maximum availability. The greatest shortage, apart from the sodium compounds, is of formaldehyde.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Manufacture of rod steel.—Aktiebolaget Bofors. April 26, 1946. 33915/1947.

Method of producing 2-(alpha-naphthylmethyl)-imidazoline.—Aktiebolaget Recip. Nov. 19, 1943. 679/1947.

Colouring of aluminium and its alloys.—Aluminium Co. of America. June 27, 1940. 12044/1947.

Resinous materials and process of preparing same.—American Cyanamid Co. May 27, 1946. 11840/1947.

Packages for use in fluid purifying.—American Cyanamid Co. July 12, 1946. 13891/1947.

Three product heavy media separation process.—American Cyanamid Co. July 16, 1946. 15043/1947.

Manufacture of fibres.—American Viscose Corporation. July 1, 1946. 11688/1947.

Dry spinning machines.—American Viscose Corporation. June 4, 1946. 11689/1947.

Method of evaporating or distilling liquids.—R. Anderson. July 11, 1946. 18301/1947.

Method for the reduction of esters, etholides, glycerides, etc.—P. Anglaret. July 5, 1946. 16862-63/1947.

Electrolytical deposition of protective coatings on aluminium and its alloys.—Anox A.G. Aug. 4, 1939. 33990/1947.

Method of preparing a hydrophilic cellulose gel.—J. J. F. Guardiola-Aragones. July 31, 1943. 34604-06/1947.

Method of consolidating refractory materials.—Canadian Refractories, Ltd. July 16, 1946. 14539/1947.

Concentration of liquids.—Celulose du Pin. Mareh 8, 1946. 34116/1947.

Manufacture of quinazoline derivatives.—Ciba, Ltd. July 9, 1946. 17451-52/1947.

Manufacture of new monoazo-dyestuffs.—Ciba, Ltd. July 15, 1946. 17453-54/1947.

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Process for continuous manufacture of cuprous hydroxide or oxide.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges & Camargue. July 4, 1946. 12787/1947.

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Preparation of organo-siloxane polymers.—Dow Chemical Co. July 8, 1946. 16385/1947.

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Hydrolysis of vinyl ethers.—General Aniline & Film Corporation. June 28, 1946. 11744/1947.

Photoprinting material.—General Aniline & Film Corporation. Dec. 20, 1945. 34475/1947.

Stabilised aryl diazo-n-sulfonate light sensitive material.—General Aniline & Film Corporation. Sept. 15, 1943. 34476/1947.

Process for the preparation of vinyl halides.—Gevaert Photo-Production N.V. July 9, 1946. 17325/1947.

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Continuous crystallisation.—Imperial Chemical Industries Ltd. June 21, 1946. 1000/1947.

Process for the simultaneous preparation of sulphuric acid, hydrochloric acid and common salt from sodium sulphate or bisulphate.—Krebs & Co., Ltd. June 25, 1946. 30217/1946.

Apparatus for halogenation of aromatic hydrocarbons.—Lummus Co. June 22, 1942. 33278/1947. Divided out of 12512/1943.

Plasticised synthetic resin compositions.—Glenn L. Martin Co. July 26, 1943. 10064/1944.

Chemical compounds and processes of preparing the same.—Merck & Co., Inc. July 13, 1946. 15458/1947.

Preparation of intermediates useful in preparation of dehydrocorticosterone acetate.—Merck & Co., Inc. July 13, 1946. 17503/1947.

Processes for preparing alkyl aryl ketones and the result therefrom.—Monsanto Chemical Co. June 26, 1946. 9121/1947.

Process for producing para-acetylbenzyl acetate and the product resulting therefrom.—Monsanto Chemical Co. June 22, 1946. 10200/1947.

Process for the production of purified partial reduction products of substituted 1,5-dinitrobenzenes.—Centrale Suiker Maatschappij, A. F. J. Appelboom and L. J. Kantebeen. March 9, 1944. 34056/1947.

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Process for preparing acetals of di- or tri-chloroacetaldehyde or the free di- or trichloroacetaldehyde.—De Bataafsche Petroleum Maatschappij. July 10, 1946. 17083/1947.

Process for preparing halogen-containing unsaturated aliphatic nitro-compounds.—De Bataafsche Petroleum Maatschappij. July 5, 1946. 17231/1947.

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Solutions, etc., manufactured from co-polymers of vinylidene halides and vinyl halides.—De Bataafsche Petroleum Maatschappij. Dec. 10, 1942. 34153/1947.

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Methods of increasing the resistance of organic material to the action of fire.—Philips' Gloeilampenfabrieken. July 4, 1946. 17275/1947.

Methods of preparing 7-halogensterolesters and 7-dehydrosterols.—Philips' Gloeilampenfabrieken. July 10, 1946. 17848/1947.

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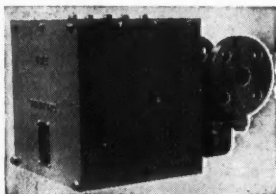
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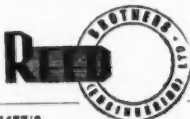
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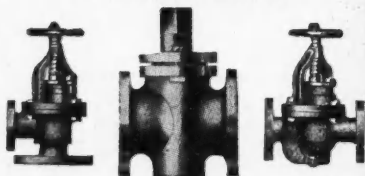
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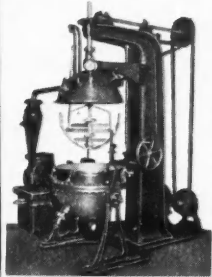
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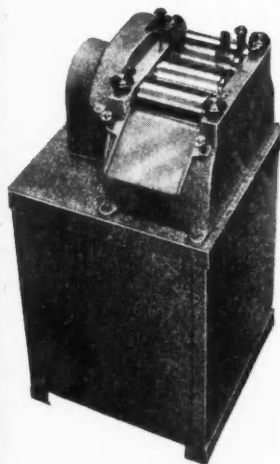


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